

SIXTEENTH BIENNIAL REPORT

**BEAR RIVER
COMMISSION**

2009 - 2010



**For the Biennium October 1, 2008,
to
September 30, 2010**

**BOUNTIFUL, UTAH
April 2012**

COVER

The Bear River Commission's bylaws provide for the creation of standing committees. In 1997, the Commission's bylaws were amended to add a Water Quality Committee as one of its standing committees. The Water Quality Committee was to be composed of the Water Quality Division Administrator for the Idaho Department of Environmental Quality, the Director of the Utah Division of Water Quality and the Administrator of the Water Quality Division of the Wyoming Department of Environmental Quality. Committee members are supported by staff within their own offices.

Early on, the Water Quality Committee determined that it would conduct an integrated five-year water quality sampling effort wherein in a few days, four times each year, the states would cooperatively work together to take water quality measurements at many stream gage locations throughout the Bear River system. Idaho and Utah provide the staff that collects the samples, and all three states share in the costs, including laboratory analysis of the samples.

There are two photos on the cover of this report showing Utah Division of Water Quality staff taking water quality measurements. The upper left photo shows the use of a hydrolab to collect data on temperature, dissolved oxygen, conductivity and barometric pressure. The location is on the Bear River's main stem near Fairview, Idaho, near the Idaho-Utah state line. In the second photo, they are preparing to take a flow measurement on the Cub River east of Franklin, Idaho, at a location near the Idaho-Utah state line.

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April 2012



**BEAR RIVER
COMMISSION**

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COMMISSIONERS**
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Charles W. Holmgren

**WYOMING
COMMISSIONERS**
Patrick T. Tyrrell
Sam Lowham
Gordon Thornock

ENGINEER-MANAGER
Don A. Barnett

April 30, 2012

Barack Obama
President of the United States
Executive Office of the President
The White House
1600 Pennsylvania Avenue NW
Washington, D.C. 20500

Dear President Obama:

Submitted herewith is the Sixteenth Biennial Report of the Bear River Commission, as requested by Article III.D.2 of the Amended Bear River Compact.

A copy of the report is being transmitted to the Governor of each signatory State to the Bear River Compact.

Sincerely,

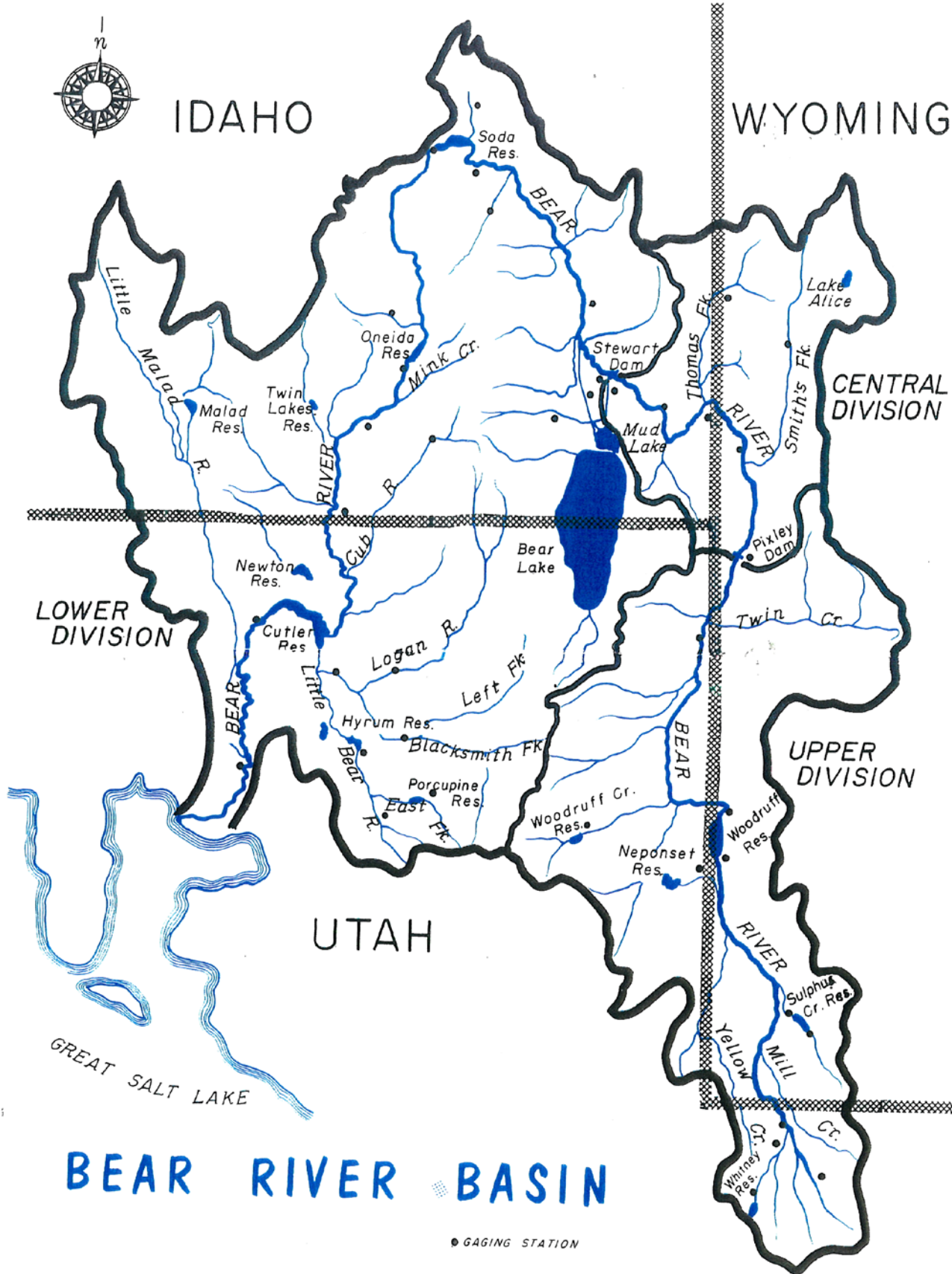
Don A. Barnett
Engineer-Manager

enclosure



IDAHO

WYOMING



BEAR RIVER BASIN

● GAGING STATION

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SIXTEENTH BIENNIAL REPORT BEAR RIVER COMMISSION

Overview

SYNOPSIS

The biennial period saw two rather different water years in terms of water supply. 2009 was relatively wet, with water supply being between 10 and 20 percent above normal, whereas 2010 was relatively dry, with water supply being 10 to 20 percent below normal. Gains were made generally in storage supply during the 2009 water year, which storage supplies were instrumental in assisting with water deliveries in 2010, which then depleted this storage supply. There were no requests in either year for interstate regulation, and during both years there was cooperation in the management and distribution of waters within the Bear River system.

This biennial report is divided into three chapters. This first chapter, the Overview Chapter, provides a background of the Compact and the Commission and its general activities. The second and third chapters provide specific water supply and streamflow distribution information for the 2009 and 2010 water years, respectively.

BACKGROUND

The Bear River Compact determines the rights and obligations of the signatory states of Idaho, Utah and Wyoming with respect to the waters of the Bear River. Federal consent to the Compact was given by the Congress and signed by President Eisenhower on March 17, 1958. The Bear River Commission was created by the Compact and has been organized as an interstate agency to administer the Compact.

The Bear River Compact was amended in accordance with Article XIII of the Original Compact (Article XIV, Amended Compact) following several years of study and review of Compact provisions. Principal amendments and other changes are discussed elsewhere in this report. Amendments to the Compact were agreed to by representatives of the compacting states on December 22, 1978, and State Amending Legislation was approved in each state in the spring of 1979. Congressional consent was given by the 96th Congress by Public Law 96-189 and signed into law by President Carter on February 8, 1980.

Article III.D.2 of the Compact was amended to provide that the Bear River Commission compile a biennial report rather than an annual report as required in the original Compact. Annual reports were compiled in each of the 21 years (1958-78) and were transmitted to the President of the United States and to the Governors of the signatory states.

This is the Sixteenth Biennial Report covering the 2009 and 2010 water years (October 1, 2008, to September 30, 2010).

River operation under the Bear River Compact and activities of the Bear River Commission during the 2009 and 2010 water years are summarized in this report, by year, in the two chapters which follow. This biennial report is organized so that specific information for each water year is reported in separate chapters. Selected streamflow records are given in the chapters discussing each water year.

COMMISSION ORGANIZATION & MEMBERS

Ten commissioners, three representing each state and one representing the United States, constitute the Bear River Commission. The Federal representative serves as chairperson without a vote, while each of the other nine Commissioners has one vote. Figure O.1 lists the Bear River Commission membership as of October 1, 2008.

The Commission amended its bylaws on April 16, 1990. The amendments allowed for the creation of three standing committees of the Commission: the Management Committee, the Operations Committee, and the Records Committee. On November 18, 1997, the Commission again amended its bylaws and changed the name of the Records Committee to the Records & Public Involvement Committee. A Water Quality Committee was also created on November 18, 1997. These standing committees have duties as assigned to them by the Commission. Each state is allowed to designate its representatives to the committees, and in all committees votes are taken by state, with each state having one vote. These four committees met from time to time on an as-needed basis throughout this biennium.

The bylaws also provide for the creation of special committees which may be assigned tasks as deemed necessary. The Technical Advisory Committee (TAC) has been created by the Commission and serves the Commission as a whole (and each of the standing committees) on technical matters. The TAC is composed of state water agency personnel and is chaired by the Engineer-Manager of the Commission.

Bear River Commission Members
(as of October 1, 2008)

Officers

ChairDee C. Hansen, Centerville, UT
 Vice-Chairman.....Rodney Wallentine, Paris, ID
 Secretary and Treasurer¹Dennis J. Strong, Centerville, UT
 Engineer-Manager² Jack A. Barnett, Bountiful, UT

Members

Idaho

David R. Tuthill³ Boise, ID
 Rodney Wallentine Paris, ID
 Marcus J. Gibbs Grace, ID

Utah

Dennis J. Strong.....Centerville, UT
 Blair Francis.....Woodruff, UT
 Charles W. Holmgren Bear River City, UT

Wyoming

Patrick T. Tyrrell Cheyenne, WY
 Sam Lowham Evanston, WY
 Gordon Thornock.....Cokeville, WY

United States

Dee C. HansenCenterville, UT

Management Committee

David R. Tuthill³ Boise, ID
 Dennis J. Strong.....Centerville, UT
 Patrick T. Tyrrell Cheyenne, WY

Operations Committee

Sam Lowham Evanston, WY
 Blair Francis.....Woodruff, UT
 Rodney Wallentine Paris, ID

Records Committee

Charles Holmgren Bear River City, UT
 Marcus J. Gibbs Grace, ID
 Gordon ThornockCokeville, WY

¹On April 16, 2009, the Commission agreed that the positions of Secretary and Treasurer would be separate. Dennis Strong was elected to continue as Secretary and Randy Staker was elected Treasurer.

²Jack A. Barnett was replaced by Don A. Barnett as Engineer-Manager on April 20, 2010

³David R. Tuthill was replaced by Gary Spackman on June 16, 2010

Figure O.1

MEETINGS

Four Regular or Annual Commission meetings were held during the biennium. The dates of the meetings are as follows:

November 18, 2008	Regular Meeting	Salt Lake City, Utah
April 16, 2009	Annual Meeting	Salt Lake City, Utah
November 17, 2009	Regular Meeting	Salt Lake City, Utah
April 20, 2010	Annual Meeting	Salt Lake City, Utah

The two regular meetings and one annual meeting of the Commission were held at the Utah Department of Natural Resources building in Salt Lake City, Utah. The April 20, 2010, annual meeting was held at the Rocky Mountain Power building in Salt Lake City, Utah. At the annual meetings held in April, elections were held and fiscal matters were addressed. A fiscal report for the biennial period, prepared by the Treasurer, has been made a part of this chapter. Formal minutes for all four of the Commission meetings have been approved and can be reviewed at the Commission offices for details concerning the Commission's actions.

COMMISSION ACTION & ACTIVITIES

This section is to provide a brief accounting of significant actions or activities of the Commission during the biennial period separate and apart from specific streamflow measurement and distribution which are discussed elsewhere in this report. Greater details relative to specific actions or activities of the Commission are contained within the Commission's approved meeting minutes.

The first meeting of the biennial period was held as a regular meeting on November 18, 2008, in Salt Lake City. The Commission received financial reports, as it does at every meeting, and received reports from the Operations Committee, the Records and Public Involvement Committee and the Water Quality Committee. The Commission discussed the grant it has from EPA. Over the last few years, efforts have moved ahead under the guidance of the Water Quality Committee. There were identified some funds left to be spent and the Commission directed how these funds were to be spent. The Commission discussed subjects already addressed by the grant, which included the potential of pollution trading. The Commission also discussed its interest in new water right filings in the Bear River Basin. It concluded that for now, the Engineer-Manager should informally report any activity at each Commission meeting.

The second meeting of the Commission during this biennial period was an annual meeting and was held on April 16, 2009, in Salt Lake City. The regular reports referred to in the previous paragraph were made to the Commission, and the Commission adopted its budget for the fiscal year starting on July 1, 2009. The Commission discussed, as it did at the last meeting, the role the Commission should play when new water right filings or filings to change water use are being considered in the drainage by each state. Following the discussion, the Commission formally adopted the "Position and Policy of the Bear River

Commission Concerning New Significant Water Right Filings and Development on the Bear River.” Noting the election of a new President, the Commission expressed its support for the continuation of Dee Hansen as the Federal Chair and instructed the Engineer-Manager to send a letter to Washington D.C. expressing the Commission’s views on this subject. Commission elections were held. The Commission determined to have the position of Secretary and the position of Treasurer held by two individuals. Dennis Strong was elected as Secretary and Randy Staker as Treasurer. Sam Lowham was elected as Vice Chairman. It was reported at the meeting by the Engineer-Manager that Nola Peterson was leaving the employment of Barnett Intermountain Water Consulting (BIWC). Nola has assisted the Engineer-Manager and served the Commission from the beginning of the period when BIWC was contracted to serve the Commission. Noting that many friendships had developed over the years, the Commission wished her well as she was leaving to be with her husband on a three-year assignment in Argentina. It was announced that Donna Keeler had been employed to take on these responsibilities. Trout Unlimited gave a report to the Commission concerning several projects recently completed by Trout Unlimited in cooperation with water users to build new water diversion structures that allow the passage of trout.

The third meeting, a regular meeting of the Bear River Commission, was held in Salt Lake City on November 17, 2009. Traditional reports were received concerning Commission expenditures and reports from all committees. It was reported to the Commission that in Idaho a federal grant had been awarded to the Franklin Conservation District and the Bear Lake Conservation District. Funds will be used to make major improvements to several canals and to install real-time gages at several locations. The Water Quality Committee reported that the work authorized by an EPA grant to the Commission was soon to be completed and a final report must be submitted before the next Commission meeting. The Commission authorized the preparation and submittal of the final report. The Technical Advisory Committee reported progress on the assignment the Commission had given it to move ahead with efforts to determine current depletions of water in each of the sections of the Compact-divided river. The Commission then gave further guidance to the Technical Advisory Committee as to how to proceed with this assignment.

The fourth and last meeting of the Commission during this biennial period was an annual meeting which was held in Salt Lake City on April 20, 2010. This meeting was chaired by the Federal Chairman Dee Hansen and reports were given by the Secretary, the Treasurer, the Operations Committee, the Records & Public Involvement Committee and the Water Quality Committee. Much of the substance of these reports is included in other portions of this biennial report. Reported here are highlights of the meeting with a focus on subjects not reported elsewhere. With this meeting, as with all Commission meetings, an understanding of what transpired at the meeting can best be obtained by referring to the formally adopted minutes. The Commission had been sponsoring a website to post real-time water stream flow and diversion information. It was noted that a contractor has provided those services and that major changes are occurring. The Commission, not being able to now see a clear path to the best future arrangement, expressed its commitment to continue to provide this information. At most Commission meetings, NRCS snow survey specialists

report future predicted water supplies. At this meeting, a very discouraging report for the next irrigation season was given, that being only 72 percent of average. Don Barnett reported the progress that had been made in determining the 2009 irrigated acres in the Bear River Basin. This information is being assembled by the states with the coordination of the Technical Advisory Committee and the Commission staff. Noting several issues yet to be resolved, the Engineer-Manager was instructed to move this issue forward over the next six months. The information is to be used by the Commission to determine water depletions in 2009. The Management Committee reported that the Engineer-Manager, Jack Barnett, has asked that he be allowed to continue to be involved with Commission issues, but not serve as a lead. He indicated his desire to resign as Engineer-Manager. The Commission was asked to support the Management Committee's recommendation that Jack's request be honored and that Don Barnett be designated as the Engineer-Manager. By motion, the Management Committee was instructed by the Commission to proceed with the processes and contracting appropriate to accomplish this.

FINANCIAL REPORT

The fiscal year of the Commission begins on July 1 of a given year and ends on June 30 of the following year. Dennis J. Strong had served as both Secretary and Treasurer of the Commission. At the April 2009 meeting, he was elected to remain Commission Secretary and Randy Staker was elected as the Commission's Treasurer. The expenditures for the period are shown in Figure O.2 and were presented to the Commission by the Treasurer.

The Commission records were audited by an auditor. The audit of accounts and records, including a statement of budget revenue and disbursements for the biennium ending June 30, 2010, is a part of the formally accepted Commission minutes.

Expenses incurred by the Bear River Commission are paid equally by the signatory states. Compensation and expenses of the federal representative, each commissioner, and each adviser are paid by the government which they represent.

**Financial Report
June 30, 2010**

	ACTUAL FY 09	ACTUAL FY 10	PROPOSED FY 11	PROPOSED FY 12
Stream Gaging	\$52,300.00	\$59,155.00	\$54,520.00	\$61,000.00
Personal Services, Engineer-Manager	62,077.16	75,533.34	57,000.00	58,700.00
Travel Expenses	659.34	779.84	1,200.00	1,200.00
Office Expenses	1,842.50	732.05	1,600.00	1,600.00
Printing Biennial Report	0.00	891.03	1,000.00	1,000.00
Treasurer Bond & Audit	100.00	100.00	1,400.00	1,400.00
Printing	1,237.87	1,319.16	1,600.00	1,600.00
Web Page/Data	6,000.00	6,031.98	6,000.00	6,000.00
Clerical	0.00	5,000.00	5,000.00	5,000.00
Contingency	0.00	0.00	3,000.00	3,000.00
TOTAL	\$124,216.87	\$149,542.40	\$132,320.00	\$140,500.00
ASSESSMENTS – Each State				
Idaho	\$40,000.00	\$40,000.00	\$40,000.00	\$40,000.00
Utah	40,000.00	40,000.00	40,000.00	40,000.00
Wyoming	40,000.00	40,000.00	40,000.00	40,000.00
TOTAL	\$120,000.00	\$120,000.00	\$120,000.00	\$120,000.00

Figure O.2

THE BEAR RIVER

The Bear River drains an area of 6,900 square miles in southwestern Wyoming, northern Utah and southeastern Idaho. Its headwaters are but 90 miles from its mouth, yet it meanders 500 miles in a circuitous course in reaching the Great Salt Lake. In its travels, it makes five state line crossings in three states. The map found on page ii shows the major features of the Bear River system.

The Bear River is not only the largest tributary to the Great Salt Lake, but is the largest stream in the North American Continent that does not flow to an ocean. Prior to settlement and irrigation development, the annual discharge of the river into the Great Salt Lake averaged an estimated 1,750,000 acre-feet. Settlement of lands adjacent to the Bear River began in about 1860, and power development began in 1907. In 1911, Bear Lake was converted into a storage reservoir by constructing inlet and outlet canals connecting the lake and the river.

Approximately 500 irrigation organizations own and operate separate irrigation systems in the Basin, supplying irrigation water for half a million acres of land. Six hydroelectric plants are in operation on the main stem of the Bear River.

In addition, a municipality, numerous communities, individual families, a variety of industrial and miscellaneous users, and waterfowl refuges withdraw water from the Bear River, its tributaries and its tributary ground water. Today, on an average, nearly a million acre-feet of water still flow annually into the Great Salt Lake from the Bear River.

BEAR RIVER COMPACT

The Bear River Compact is a document voluntarily adopted by the states which establishes the rights and obligations of Idaho, Utah and Wyoming with respect to the waters of the Bear River. The Compact became effective on March 17, 1958.

The main purposes of the Compact are outlined in paragraph A of Article I of the Compact, which states:

The major purposes of this Compact are to remove the causes of present and future controversy over the distribution and use of the waters of the Bear River, to provide for efficient use of water for multiple purposes, to permit additional development of the water resources of Bear River, and to promote interstate comity.

The Original (1958) Compact provided the following:

- Divided the Bear River into three main divisions: the Upper Division, the Central Division, and the Lower Division, with subdivisions or sections created in the Upper and Central Divisions. The Compact specifically identified which river flows and canal diversions are to be assigned to each of the divisions.
- Apportioned the direct flows of the Bear River and its tributaries between Utah and Wyoming in the Upper Division (upstream of Pixley Dam) and between Idaho and Wyoming in the Central Division (Pixley Dam to Stewart Dam).
- Did not specifically allocate the water in the Lower Division between the states of Idaho and Utah. The Compact did, however, provide a mechanism wherein a Utah water user may allege that because of diversions within Idaho, he is being deprived of water to which he is justly entitled and request distribution across the state line. If the Commission finds this to be the case, the Commission may declare a water emergency and establish a water delivery schedule in the Lower Division based upon priority of rights without regard to the state line.
- Defined the pre-compact storage rights for each of the three states in reservoirs above Bear Lake and established additional rights to store above Stewart Dam 36,500 acre-feet of Bear River water in any water year. This 36,500 acre-feet of storage is referred to as "Original Compact Storage" and was allocated to each of the states as follows:

Utah	17,750 acre-feet
Wyoming	17,750 acre-feet
Idaho	1,000 acre-feet
- Reserved a portion of the storage capacity in Bear Lake for primary use by, and protection of, irrigation uses and rights downstream from Bear Lake. This compact-provided-for "irrigation reserve" establishes minimum Bear Lake levels which correspond to upstream storage development, below which Bear Lake cannot be drawn down only for power purposes.

AMENDED BEAR RIVER COMPACT

Proposed amendments to the Bear River Compact were approved by the Commission in December 1978 and the Amended Compact became law on February 8, 1980. Amendments provide for the following principal changes to the 1958 Compact:

Amendment Highlights

- The allocation and distribution of direct flow rights between the various sections in the Upper and Central Divisions are unchanged from the 1958 Compact.
- Additional storage is granted above Bear Lake for 74,500 acre-feet, of which 4,500 acre-feet is granted to Idaho and 35,000 acre-feet is granted each to Utah and Wyoming. This storage, plus water appropriated (including ground water) and applied to beneficial use after January 1, 1976, is limited to an annual depletion of 28,000 acre-feet, of which Idaho is allocated 2,000 acre-feet and Utah and Wyoming are allocated 13,000 acre-feet each. This additional storage in the Upper and Central Division will not be allowed when the elevation of Bear Lake is below 5911 feet (Utah Power and Light datum).
- Additional rights are granted to store water in the Upper and Central Divisions which would otherwise be spilled or bypassed from Bear Lake when all other direct flow and storage rights are satisfied. These storage rights are allocated with equal priority as follows: 6 percent to Idaho, 47 percent to Utah and 47 percent to Wyoming.
- The method for the declaration of a water emergency in the Lower Division and the distribution of direct flow diversions by priority without regard to state line is unchanged from the 1958 Compact.
- The water not applied to beneficial use prior to January 1, 1976, including ground water tributary to the Bear River, is allocated on a depletion basis.
- In the Lower Division, Idaho is granted the first right to develop and deplete 125,000 acre-feet. Utah is granted the second right to develop and deplete 275,000 acre-feet. The next 150,000 acre-feet of water depletion will be divided equally between Utah and Idaho. All water in excess of the above allocations will be divided between Utah and Idaho, with Idaho receiving 30 percent and Utah 70 percent.

Compact Required Depletion Estimates

The Amended Bear River Compact, as referenced above, states several of the new provisions allowing for additional storage and use of waters subsequent to January 1, 1976, be administered based on depletions. The Compact provides that Commission-approved procedures shall be adopted to make such depletion estimates. Working under the direction of the Commission, the Technical Advisory Committee (TAC) was given the assignment to make these depletion estimates. First, at Commission meetings, the TAC presented base

maps delineating irrigation water usage up through January 1, 1976. The TAC then moved forward in their assignment to make estimates of depletions subsequent to January 1, 1976.

The depletion estimates submitted by the states represented changes from January 1, 1976, to January 1, 1990. At the November 1993 Commission meeting, the Commission formally adopted these Commission-approved procedures which allow for common depletion calculations. These Commission-approved procedures direct that the latest depletion estimates should be included in the Biennial Report. Figure O.3 represents the most recent depletion estimates.

**Bear River Commission
Estimated Annual Depletions¹
Changes from January 1, 1976, to January 1, 1990**

ABOVE STEWART DAM

State	Allocation	Agricultural Depletions	M&I Depletions	Total Depletions	Remaining Allocation
Wyoming	13,000	1,996	781	2,777	10,223
Idaho	2,000	1,293	0	1,293	707
Utah	13,000	5,106	177	5,283	7,717

LOWER DIVISION

State	Allocation	Agricultural Depletions	M&I Depletions	Total Depletions	Remaining Allocation
Idaho	125,000 ²	7,348	-48	7,300	117,700
Utah	275,000 ³	2,936	1,178	4,114	270,886

¹All values are in acre-feet. Data were obtained from the appendices of the April 22, 1992, Bear River Commission meeting minutes. Any reductions in pre-1976 depletions are reflected in the above numbers. With the exception of Woodruff Narrows Reservoir, reservoir evaporation was not calculated.

²First right under Compact - Compact grants additional rights.

³Second right under Compact - Compact grants additional rights.

Figure O.3

ADMINISTRATION OF BEAR RIVER COMPACT

General

Provisions of the Compact are generally administered and enforced under the direction of the Bear River Commission. However, water rights within each state are adjudicated and administered in accordance with state law, subject to limitations provided in the Compact.

Seasonal daily records are collected on about 130 diversions above Bear Lake by state river commissioners under the direction of their respective State Engineers and under the general supervision of the Commission's Engineer-Manager. These records include all of the diversions from Bear River main stem and Smith's Fork, as they are required to administer the Bear River Compact. Daily discharge records for canals in the Upper and Central Divisions are published in this biennial report and have been published in previous biennial reports.

The Engineer-Manager determines when, under provisions of the Compact, a water emergency exists in the Upper or Central Divisions. Once a determination has been made of a water emergency, the Engineer-Manager is in weekly phone contact with state river commissioners as to flows and diversions and, at least once a week, allocates the water within the Upper and Central Divisions as provided for under the Compact. The Engineer-Manager also inspects diversions in the field as needed to ensure the equitable apportionment of the water of the Bear River as provided for under the Compact.

Storage

New Storage

The original Compact defines storage rights in existing reservoirs above Bear Lake and provides for an additional storage allowance of 36,500 acre-feet annually. Idaho users on Thomas Fork are allotted 1,000 acre-feet of this amount, and the remainder is divided equally between Wyoming and Utah.

The reservoirs listed in Figure O.4 have been constructed under the additional storage provisions of the original Compact.

Constructed Additional Storage Provided for Under the Original Compact

<i>Reservoir</i>	<i>Allocation</i>
Sulphur Creek Reservoir (Wyoming)	4,614 ac-ft
Sulphur Creek Reservoir Enlargement (Wyoming)	1,268 ac-ft
J. L. Martin Reservoir, Sulphur Creek (Wyoming).....	88 ac-ft
A. J. Barker Reservoir, Yellow Creek (Utah)	162 ac-ft
Hatch Brothers Reservoir (Utah)	350 ac-ft
Woodruff Narrows Reservoir (Wyoming)	3,250 ac-ft
Woodruff Narrows Reservoir (Utah)	15,240 ac-ft
Whitney Reservoir (Wyoming).....	4,200 ac-ft
Wyman Reservoir (Wyoming).....	22 ac-ft
Massae Reservoir (Wyoming).....	107 ac-ft
Massae Reservoir Enlargement (Wyoming)	51 ac-ft
Woodruff Creek Reservoir (Utah)	2,000 ac-ft
Coy Reservoir (Wyoming).....	50 ac-ft
TOTAL ALLOCATION	31,402 ac-ft

Figure O.4

Additional storage allowance is granted under the Amended Compact. Woodruff Narrows was enlarged in 1980 under this provision from a spillway capacity of 28,100 acre-feet to 57,300 acre-feet. Allocated to this enlargement is: Utah, 18,000 acre-feet, including 6,686 acre-feet depletion; and Wyoming, 2,960 acre-feet, including 871 acre-feet depletion.

Sulphur Creek Reservoir was enlarged in 1988 to a total capacity of 19,775 acre-feet. Allocated to this enlargement is 10,315 acre-feet (9,370 for municipal use), including 701 acre-feet for depletion.

Bear Lake

Article VI of the Compact provides an irrigation reserve level in Bear Lake below which water shall not be released solely for generation of power, except in emergency; but after release for irrigation, it may be used in generating power as it is conveyed to irrigation diversion works. The reserve is to be increased by designated amounts as additional storage, allocated by the original Compact, is developed above Bear Lake. No additional storage was built pursuant to this provision in the Compact during the biennial period, and so the irrigation reserve elevation remained at 5,914.61 feet, with an active storage content in Bear Lake of 794,000 acre-feet. This irrigation reserve elevation corresponds to 30,000 acre-feet of developed additional original Compact storage allocation.

Water Supply

The Commission uses three stream gages, one in each of the three river divisions, as general indicators of the water supply during a given year in the respective divisions. Each of these three gages has a period of record beginning in 1943 and continues to the present. There are not significant streamflow diversions above these three gages and, hence, they are used to approximate natural flow conditions.

In the Upper Division, most of the Bear River streamflow originates on the north slopes of the Uinta Mountains and flows northward across the state line into Wyoming. The USGS Utah-Wyoming State Line Gage has been used as a good indicator gage of the water supply generally available above Bear Lake and, in particular, to the Upper Division.

Inflow from the Smith's Fork to the Bear River in the Central Division often represents half, or more, of the combined flow of the Bear River at this location. Therefore, the USGS gage on Smith's Fork has been used by the Commission as an indicator of the available water supply in the Central Division.

A large amount of the available water supply in the Lower Division originates and is diverted in the Cache Valley. The major streams which are tributary to the Bear River in the Cache Valley originate in the mountains on the east side of the valley. One of these tributaries, the Logan River, has been used by the Commission as a good indicator gage of the water supply available for diversion in the Cache Valley and, in general, in the Lower Division. Several canals divert from the Logan River above the USGS gaging station. Hence, in order to gain a good record of approximate natural flow conditions, the canal diversion data are added to the USGS stream gage data to generate a combined Logan River

flow value. It is this combined Logan River data which is used as an indicator of the general water supply in the Lower Division.

Streamflow Distribution

The administration of the distribution of the waters of the Bear River between the three Compact states and the various subdivisions of the river, as defined by the Compact (the river crosses state lines five times), is defined by the original Compact. When the flow of the river in the Upper and Central Divisions decreases to certain levels, the Engineer-Manager is to declare a "water emergency" and supervise the allocation of water between the sections within the divisions of the river as directed by the Compact.

The Compact provides that in the Upper Division, which comprises all of the Basin from its headwaters down to and including Pixley Dam, there shall be two sections administered in Wyoming and two sections administered in Utah. The Compact provides that when the total natural flow diversion in the division, plus the flow passing Pixley Dam, is less than 1,250 cfs (divertible flow) a water emergency exists and such divertible flow is allocated to the sections as follows:

Upper Utah Section	0.6 percent
Upper Wyoming Section	49.3 percent
Lower Utah Section	40.5 percent
Lower Wyoming Section	9.6 percent

The Amended Compact further provides in Article IV.A.1.e. that:

If for any reason the aggregate of all diversions in a river section of the Upper Division does not equal the allocation of water thereto, the unused portion of such allocation shall be available for use in the other river sections in the Upper Division in the following order: (1) In the other river section of the same State in which the unused allocation occurs; and (2) in the river sections of the other State. No permanent right of use shall be established by the distribution of water pursuant to this paragraph e.

The Compact defines the Central Division as comprising that part of the Basin from Pixley Dam down to and including Stewart Dam (the point of diversion to Bear Lake). It includes one section in Wyoming and one in Idaho.

Divertible flow in the Central Division is the sum of diversions from Smith's Fork and designated tributaries, diversions from Bear River in the division, diversion to Bear Lake via the Rainbow Inlet Canal, and flow passing Stewart Dam. A water emergency shall exist when this divertible flow is less than 870 cfs, or when the flow of the Bear River entering Idaho (gaging station at Border) is less than 350 cfs. Wyoming diversions are limited to 43 percent of divertible flow during a water emergency.

Interim procedures for the Lower Division Water Delivery were adopted several years ago. No formal requests for the declaration of a water emergency in the Lower Division were received by the Commission in this biennial period.

Stream Gaging Program

The Commission has concluded a record of the streamflows in the Bear River drainage is most important as this record is needed: 1) for the measurement and subsequent distribution of waters during the irrigation season in compliance with the Compact; 2) to verify the compliance of diversions with the Compact; 3) for the review of the Compact, as is required from time to time; and 4) for the three states to plan for water resource use and development. As an indication of the Commission's commitment to the stream-gaging program, the Commission allocated in the biennium approximately 50 percent of its budget to the stream-gaging program. PacifiCorp, the individual states, and water user organizations maintain additional records of streamflows and canal diversions. A composite of all of the records is needed to accurately reflect the waters available for use in the Bear River drainage.

All of the stream gages supported by the Commission are operated and maintained by the U.S. Geological Survey (USGS). The USGS is well recognized as a leader in stream-gaging technologies, and their records are used as a standard for planning, water distribution and legal purposes. The cooperative agreement between the Bear River Commission and the USGS provides that both contribute to the funding of the program. The adequacy of the stream-gaging program is constantly reviewed by the Commission's TAC, by Commission members and by the USGS.

Lists of the individual gages supported during the biennium and the records of key gages during the biennium are made a part of this report, and respective detail is provided in the 2009 and 2010 chapters of this report. The locations of the gages that were in operation during the biennial period are shown on Figure O.5.

BIENNIUM STATE ADMINISTRATION

Article XI of the Amended Compact provides that applications for appropriation or change in water use within each state shall be in accordance with individual state law, except no such application shall be approved if the effect will deprive water users within another state or increase the depletion beyond that which is provided for under the Compact. This article further requires that state officials report, in a format and at intervals established by the Commission, the status of their respective allocations and uses. The Commission has determined the best format for reporting such change in uses is the Biennial Report. Details of state water-related activities are shown in the respective years' write-ups.

WATER QUALITY EFFORTS

For the first time in the Commission biennial reports, the Commission chose to report on water quality efforts in the Fourteenth Biennial Review. The history of the Commission's efforts to become involved in water quality issues was reported in that earlier biennial report. The reader is encouraged to refer to that report if more historic information is desired.

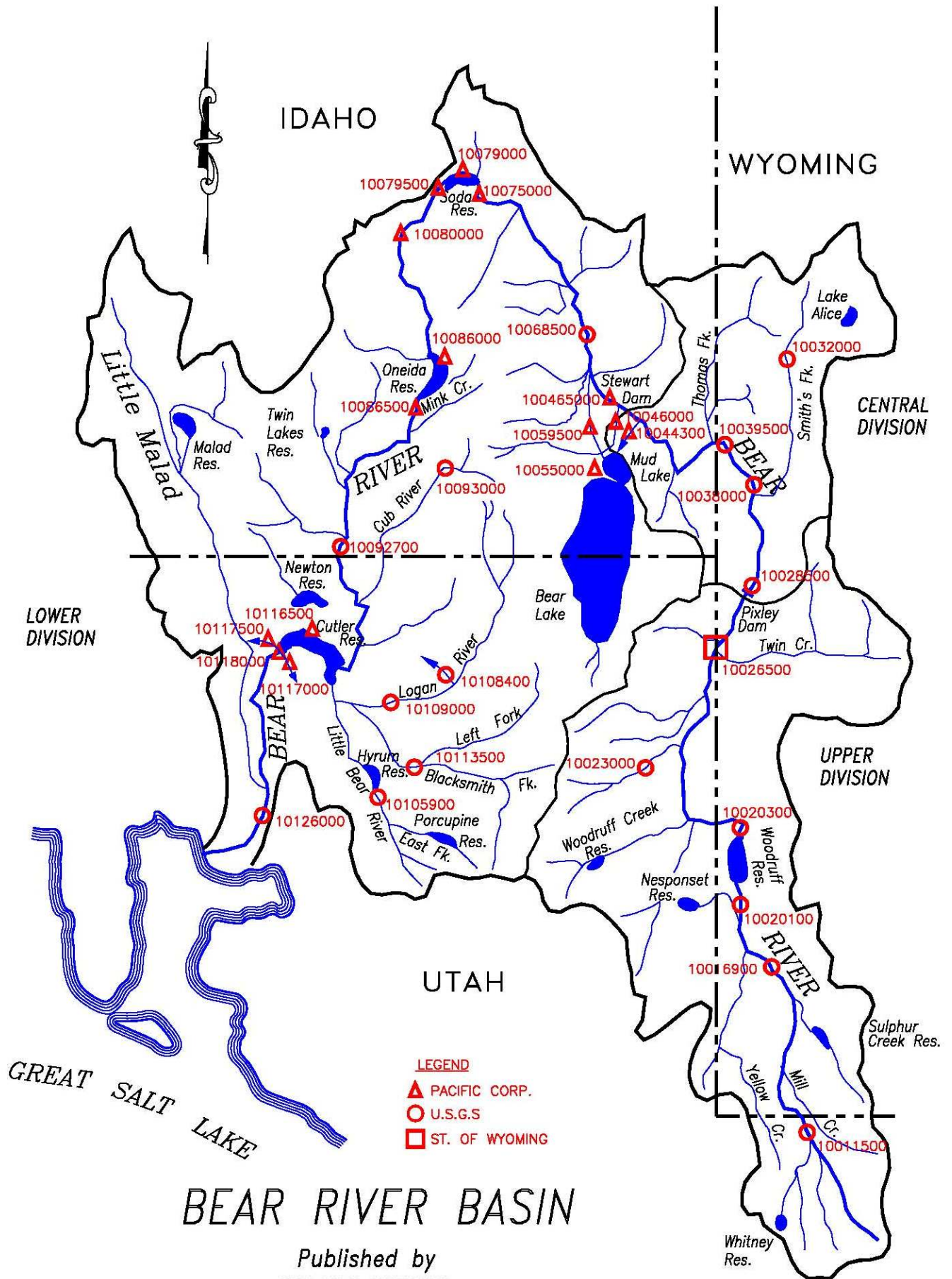


Figure O.5

The Commission has no responsibility to administer water quality standards. This is an area of specific state and federal laws administered by the state agencies with jurisdiction concerning water quality and the federal Environmental Protection Agency (EPA). However, the Bear River Commission is the only entity recognized by the three states and the federal government that has responsibility throughout the entire river system without regard to state lines. The Commission has been encouraged by stakeholders to become involved in a coordinating way. Responding, the Commission created a Water Quality Committee.

At the urging of the Committee, the Commission applied for and obtained from EPA a Targeted Watershed Grant. During this biennial period, much was accomplished with respect to the tasks outlined in the grant by the Committee and Utah State University, as a contractor to the Commission.

This EPA grant was a significant grant, totaling more than \$700,000. After considering options, the Commission contracted with Utah State University (USU) and the staff of its Water Laboratory to perform many of the tasks. The Commission looked to the Water Quality Committee to take the lead role and that committee created a Steering Committee that met often with USU staff. The Commission Engineer-Manager took a managerial role for the Commission.

The grant began in October 2004 and, with an extension authorized by EPA, the final report was released in December of 2009. This five-year effort was most successful. There were four major focuses of the grant effort. The first was the creation of a Water Information System (WIS). This basinwide information source is judged to be most valuable, and the three state water quality agencies and USU have entered into contracts to maintain this system.

The second focus was the creation of a water quality model of a portion of the river system. New analytical technology created by USU made this a unique and most useful system. The model was needed as a tool as the study analyzed the potential for water pollution trading in a portion of the basin. The combined approach stimulated interest in EPA administrators nationwide. The third focus was to use this model to evaluate potential pollution trading. The last effort was to advance the information obtained to stakeholders and potential users.

The Water Quality Committee has created a basinwide water quality monitoring program. Using existing water flow measuring points on the River, samples are collected and analyzed four times a year. All three states are involved in this effort. This effort is committed to a five-year program and is moving ahead as planned.

Because water quality administration is an important part of water resource administration, the Commission felt it is important that it briefly include in each biennial report some of these water quality activities. Water quality and water quantity issues sometimes cannot be separated. However, because the Commission has no administrative role in the water quality area, the Commission chooses to report this activity in this overview chapter of the biennial report and not in the individual year chapters.

2009 WATER SUPPLY AND DISTRIBUTION REPORT

2009 Water Supply and Distribution Report

OVERVIEW

The 2009 water year was dramatically different from the prior year with notably above-normal streamflow in all divisions during the irrigation season. No calls for a water emergency were received in any division. The 2009 year ended with more water in storage than was in storage at the beginning of the year.

WATER SUPPLY

Three stream gages, one in each division of the river, have been used by the Commission as indicator gages of the relative supply available for each of the divisions of the river (see Stream Gaging Program section in the Overview chapter). The Utah-Wyoming State Line and Smith's Fork gages measure a major portion of the streamflow in the Upper and Central Divisions, respectively. The Logan River is a major tributary to the Bear River in Cache Valley, which is in the Lower Division. Specific discharges, as measured by the USGS for the three gages during 2009, compared with the long-term averages, are summarized in Figure 2009.1 and are graphically illustrated in Figures 2009.2 through 2009.4 on the subsequent pages.

Figure 2009.1 illustrates a summary of the volumetric discharge for each of these gages for the water year. As the water supply available during the irrigation season is most critical for filling the natural flow rights, the discharge as measured at these gages during the irrigation season is also illustrated in Figure 2009.1.

Figures 2009.2 through 2009.4 show hydrographs for each of these three gaging stations. On each hydrograph, the mean daily flow during the irrigation season is plotted against the average of the mean daily flows for the period 1943 through 2009. The area between the 2009 hydrographs and the mean hydrographs represents the difference in volume of water discharged during 2009 versus the long-term average. This volumetric difference is illustrated by the bar charts shown on each of the figures.

As can be seen in Figure 2009.1, the annual discharge for the Upper Division (Utah-Wyoming State Line gage) was 110 percent of the long-term average, and streamflow on Smith's Fork and the Logan River were 116 and 103 percent, respectively. More important to the natural flow diversions than the streamflow during the water year is the streamflow during the irrigation season of May through September. During this period, the water

2009 Water Supply Summary by Division

2009 WATER YEAR

(Discharge in Acre-feet)

GAGE	AVERAGE (1943-09)	2009	PERCENT
Upper Division (UT-WY State Line)	138,800	152,100	110%
Central Division (Smith's Fork)	136,900	158,800	116%
Lower Division (Logan River)	182,000	187,800	103%

2009 IRRIGATION SEASON

MAY - SEPTEMBER

(Discharge in Acre-feet)

GAGE	AVERAGE (1943-09)	2009	PERCENT
Upper Division (UT-WY State Line)	114,700	129,000	113%
Central Division (Smith's Fork)	102,100	124,400	122%
Lower Division (Logan River)	122,000	133,700	110%

Figure 2009.1

supply was approximately 113 percent (Upper Division), 122 percent (Central Division), and 110 percent (Lower Division). These numbers show a notable greater than normal streamflow with even a higher percent of normal during the critical irrigation season.

A closer look at the three hydrographs (Figures 2009.2, 2009.3 and 2009.4) is also insightful when one is trying to understand the natural water supply in the spring and summer of 2009. The Upper Division gage (Figure 2009.2) indicates runoff peaked twice; once in mid-May and again in mid to late June after which flows remained near normal for the remainder of the irrigation season. The Central Division gage (Figure 2009.3) indicates runoff also peaked twice in mid to late May and then again in late June after which streamflow remained above normal through the remainder of the irrigation season. The Lower Division gage (Figure 2009.4) streamflow peaking in late May through early June with flows about normal through the remainder of the irrigation season.

2009 - Upper Division Water Supply

Flow at Utah-Wyoming State Line Gage

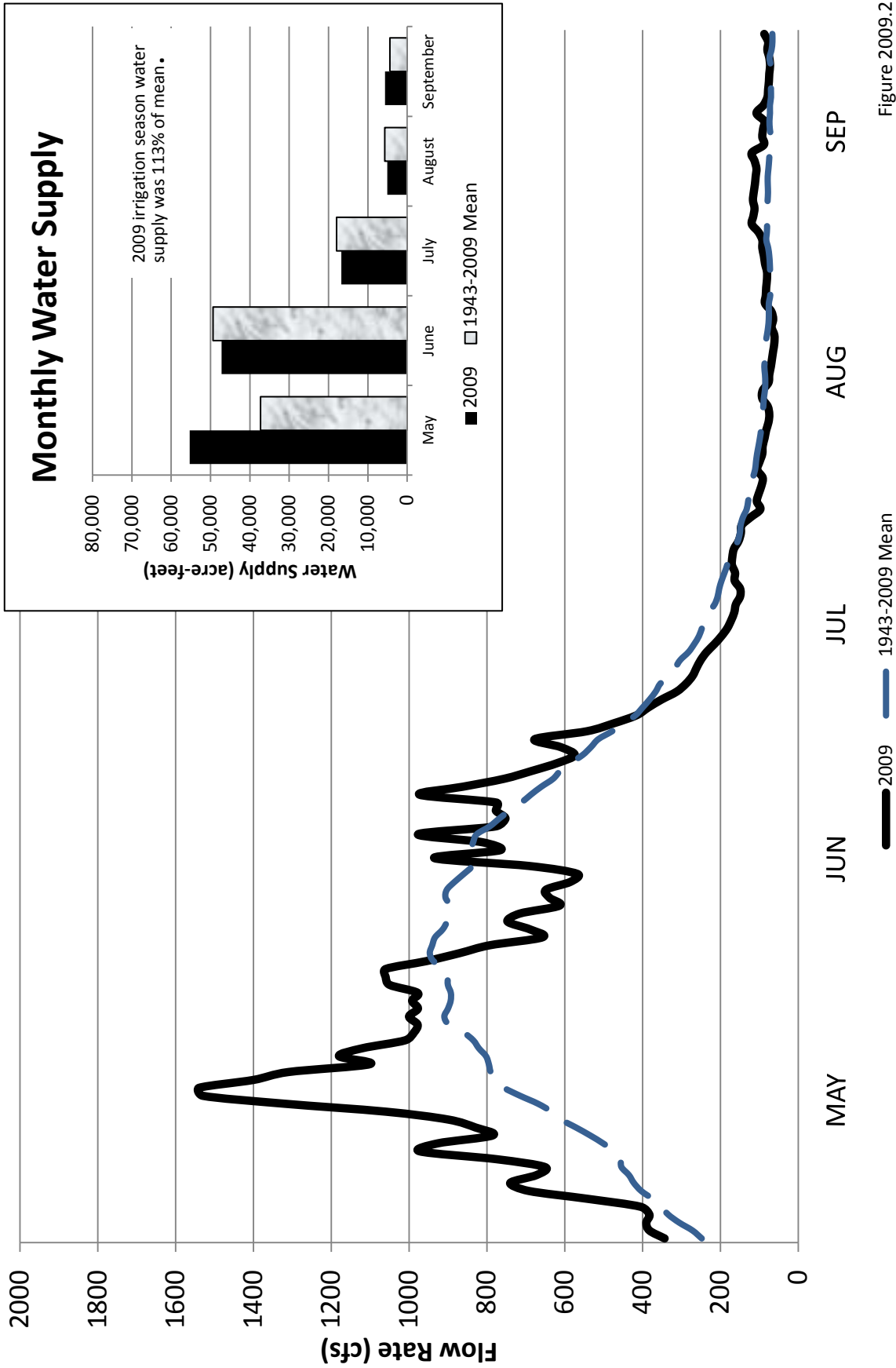


Figure 2009.2

2009 - Central Division Water Supply

Flow at Smiths Fork near Border, Wyoming Gage

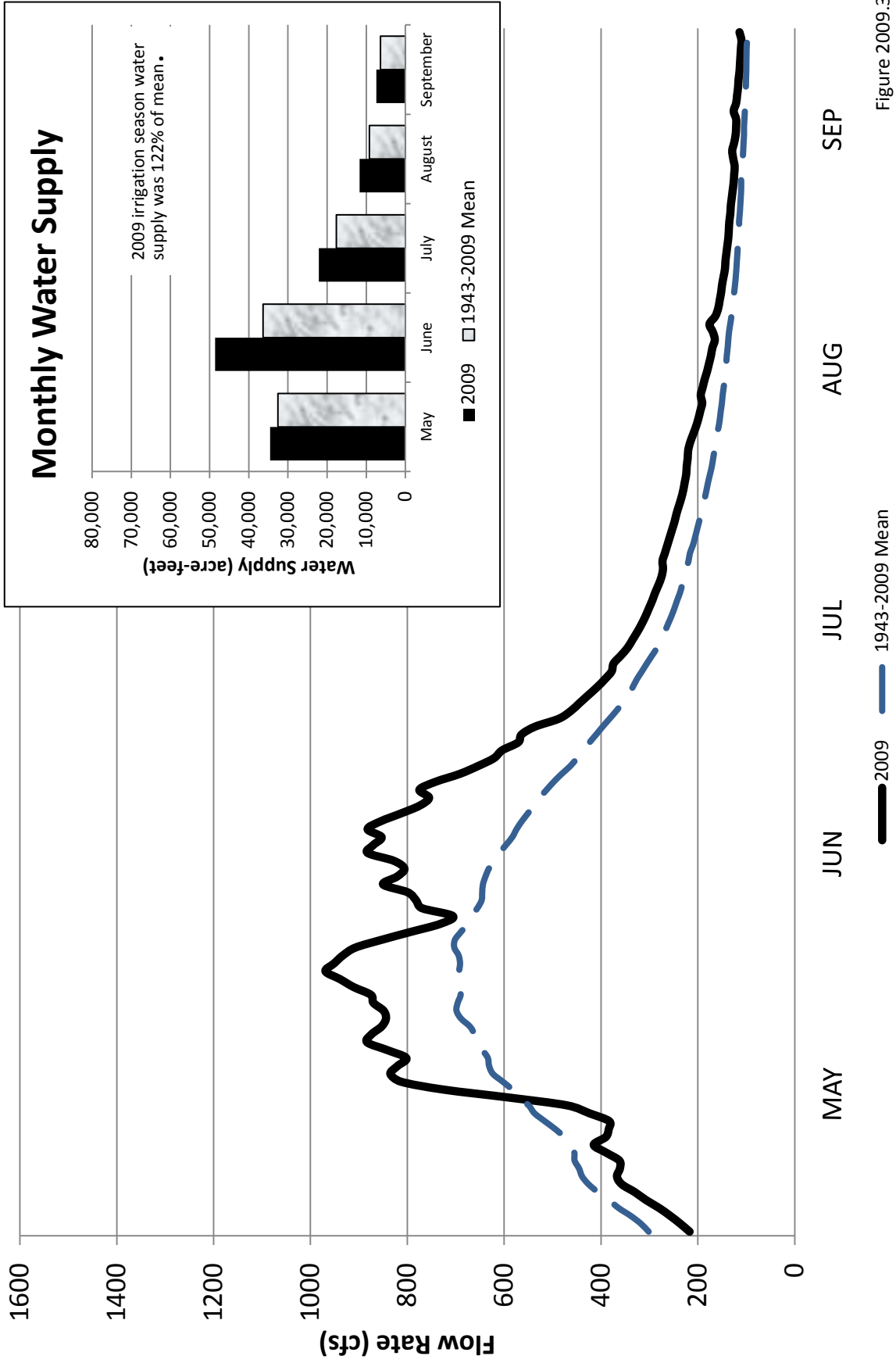


Figure 2009.3

2009 - Lower Division Water Supply

Flow at Logan River Combined Gage

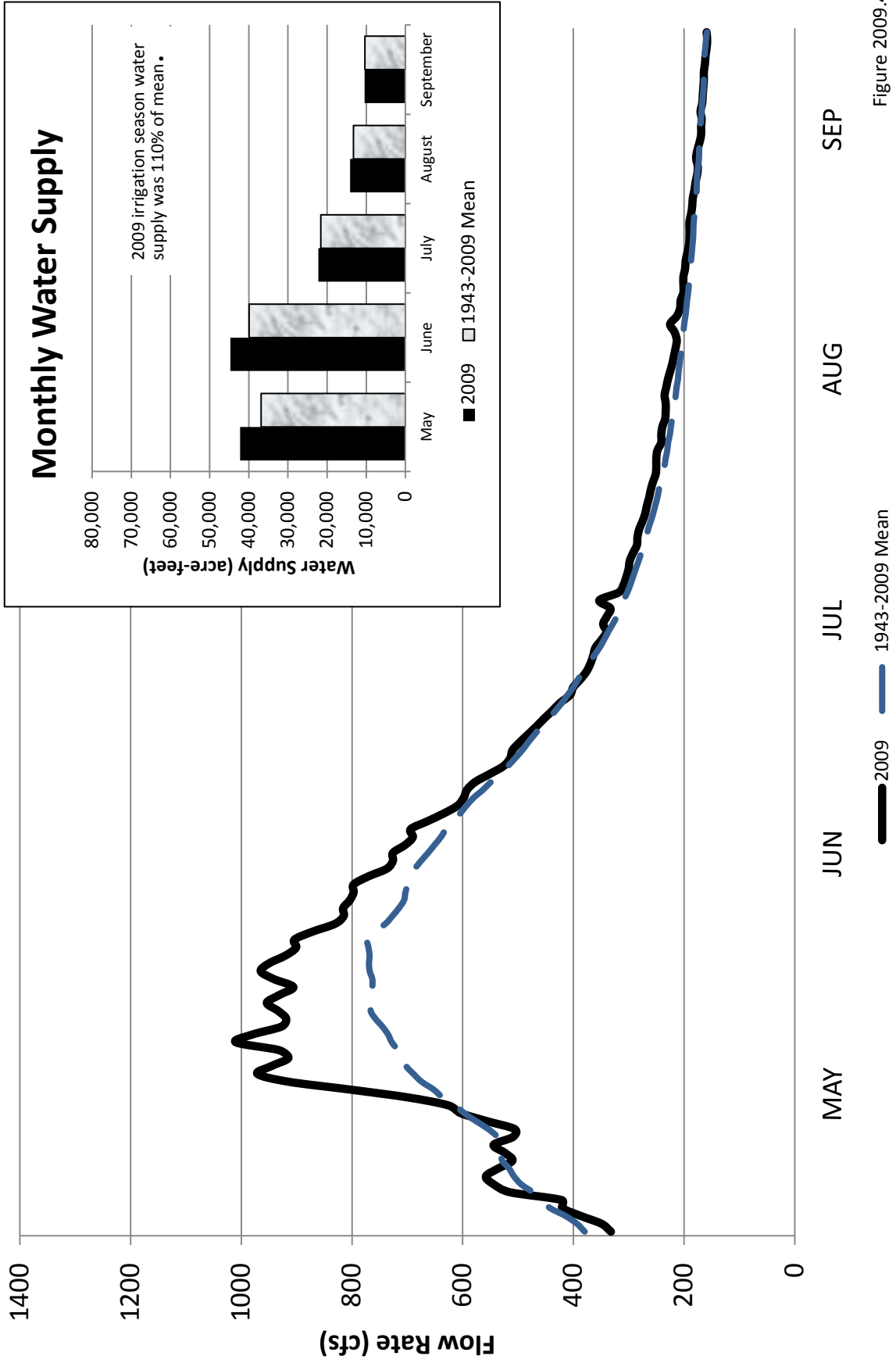


Figure 2009.4

STORAGE

Storage supplies along the Bear River have a notable impact on the water resources available for irrigation each year. Because the prior water year was a decent water year, storage in the 2009 water year started with more carryover storage than had been the case in the preceding recent years. Woodruff Narrows Reservoir is the largest reservoir in the Upper Division. However, Whitney, Sulphur Creek, and Woodruff Creek Reservoirs also provide for notable amounts of winter storage.

Paragraph B of Article VI of the Amended Compact, which allows for additional storage rights above Stewart Dam, also has a provision which restricts storage to occur if the water surface elevation at Bear Lake is below an elevation of 5911.0 (UP&L Datum). About half of the storage which is assigned to Woodruff Narrows Reservoir, from both the States of Utah and Wyoming, fall under this provision of the Amended Compact. Bear Lake was below this storage restriction elevation at the start of the storage season, thus, this provision of the Compact was activated. However, with fairly large carryover amounts and the transfer of unbuilt original Compact storage allocations, Woodruff Narrows, Sulphur Creek and Whitney Reservoirs were all able to fill. Additionally, midway through the storage season, Bear Lake levels rose above 5911. Figure 2009.5 shows the filling of Woodruff Narrows. Because it was an above average water year, Woodruff Narrows was not heavily drafted and ended the year with a significant carryover.

Prior to 1997, a gage was maintained, with Commission funding, by the USGS on Woodruff Narrows Reservoir. The gage included a recorder which allowed for preservation of daily values. Since this time, periodic measurements have been kept by the Woodruff Narrows Reservoir Company in coordination with the Wyoming State Engineer's Office. Figure 2009.5 shows the maximum and minimum contents for the Woodruff Narrows Reservoir since its enlargement in 1980. Values for 2007 are based on observations made by the Woodruff Narrows Reservoir Company.

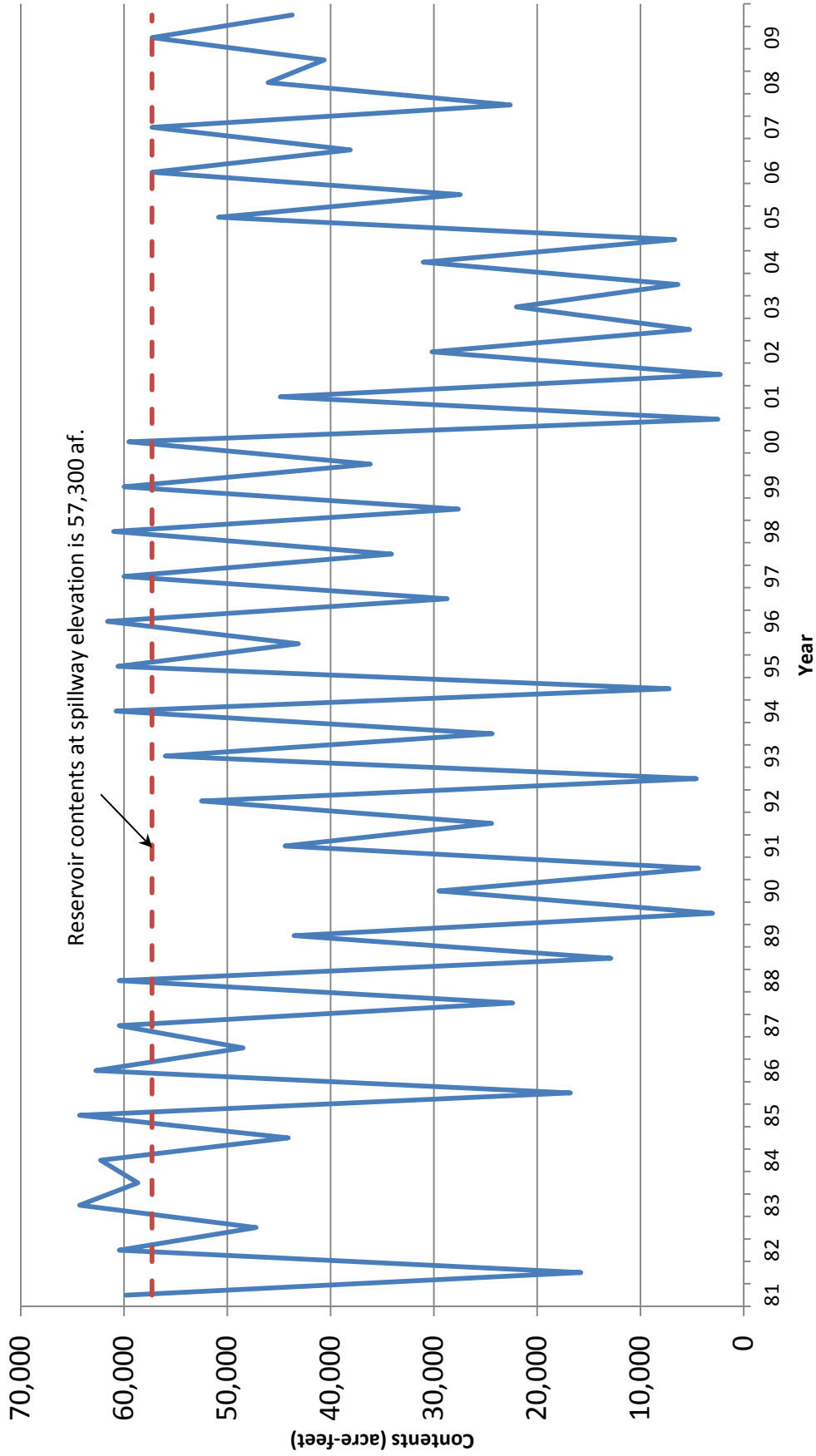
The spillway crest of Woodruff Narrows Dam is at an elevation of 6454.5 feet; contents of 57,300 acre-feet. Hence, contents above this amount represent uncontrolled storage as this storage is only temporary and cannot be controlled by the reservoir company. Generally, during spill periods, the reservoir company is often releasing significant flows through its outlet works as well. Hence, though the total contents are uncontrolled, the proportion of water discharging from the reservoir through the outlet works versus over the spillway is somewhat under the control of the reservoir company. Both discharge to the Bear River below the dam but above the stream gage and it makes no difference to the total discharge into the Bear River.

There is no significant storage in the Central Division.

The largest and most significant storage reservoir in the Lower Division, and in the entire watershed, is Bear Lake, which is at the very top of the Lower Division. Bear Lake is operated as a storage reservoir by PacifiCorp. The Compact regulates various aspects of how PacifiCorp can manage the storage of water within Bear Lake. Figure 2009.6 summarizes the 2009 Bear Lake hydrologic information and significant operational events.

Woodruff Narrows Reservoir

Annual Maximum and Minimum Contents



Note: Through the 1996 water year a gage with a recorder was maintained by the USGS on Woodruff Narrows Reservoir. Since this time, values are based on spot observations and estimates by the Woodruff Narrows Reservoir Company and the Wyoming State Engineer's Office. Contents above 57,300 af represent uncontrolled storage.

Figure 2009.5

**Summary of Significant
2009 Bear Lake
Hydrologic Information and Operational Events**

<u>Date</u>	<u>Hydrologic Information/Event</u>	<u>Contents (% of Full) Discharge (% of Normal)</u>
10-01-08	Bear Lake Beginning Elevation — 5907.77	350,700 af (25%)
11-02-08	Bear Lake Low Elevation ¹ — 5907.68	345,054 af (24%)
	Rainbow Inlet Canal Discharge	261,700 af (101%)
	Bear River Discharge Below Stewart Dam	5,722 af
	Bear Lake Net Runoff (Computed Total Inflow less Lake Evaporation)	281,000 af (87%)
07-12-09	Bear Lake High Elevation — 5912.34	644,090 af (45%)
	Outlet Canal Releases: 7/2-9/30 (91 days)	93,217 af (32%)
07-22-09	Outlet Canal Maximum Releases – 1,140 cfs	
	Bear Lake Storage Release ²	42,487 af
09-30-09	Bear Lake Ending Elevation — 5,910.66	534,802 af (38%)

¹ Low contents prior to start of storage.

² Credited release from Bear Lake, subtracting Rainbow inflow and the decreed adjustment for the natural yield of Bear Lake and Mud Lake area.

Figure 2009.6

Figure 2009.6 provides much information as to the water stored in Bear Lake in 2009. Some of this information will be discussed in the “Lower Division” section of this report. It is important to note from Figure 2009.6 that the lake ended the 2009 water year almost three feet higher than at the beginning of the year. It can be noted that the demand on storage from the lake was significantly less than normal and that the storage contents in the lake increased by nearly 200,000 acre-feet over the prior year’s storage carryover.

Figure 2009.7 is a graph which shows the annual maximum and minimum elevations of Bear Lake since 1915. With a beginning elevation well below the operating target, Bear Lake was operated in storage mode during the entire storage period. Figure 2009.8 is an area plot showing the daily contents in Bear Lake over the past ten years. This hydrograph and Figure 2009.7 show the significant reduction in Bear Lake water levels in the early 2000s, followed by somewhat level, but low lake levels the past few years. Bear Lake has such a large storage capacity compared to average annual use that it greatly buffers the potential shortages in the Lower Division over a period of below-normal years, but for the same reason, recovery from a depleted reservoir can be slow.

BEAR LAKE ELEVATION

Annual Maximum & Minimum Elevations

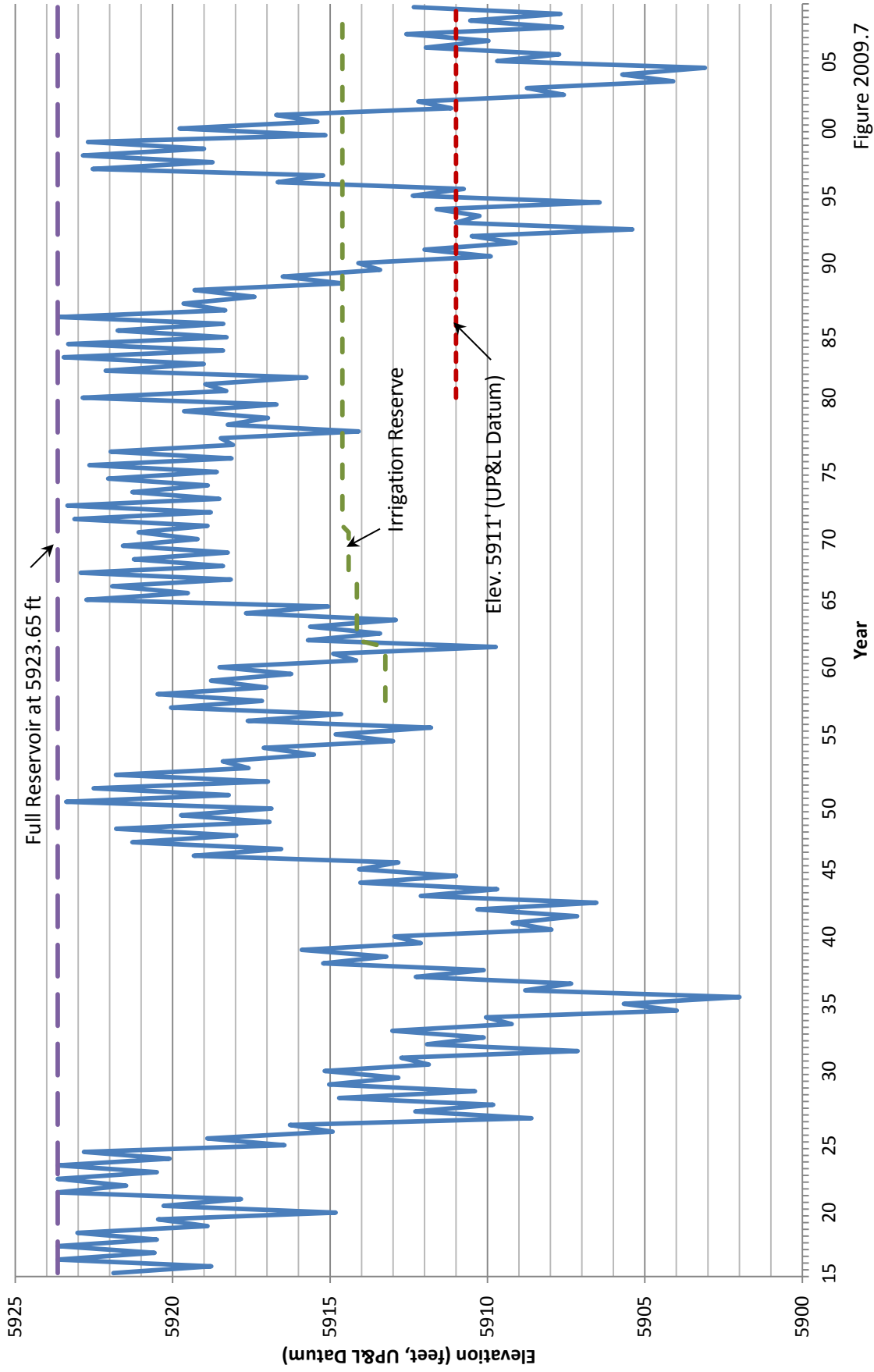


Figure 2009.7

BEAR LAKE CONTENTS

Water Years 2000 - 2009

Bear Lake's maximum active storage contents is 1,421,000 at an elevation of 5923.65'.

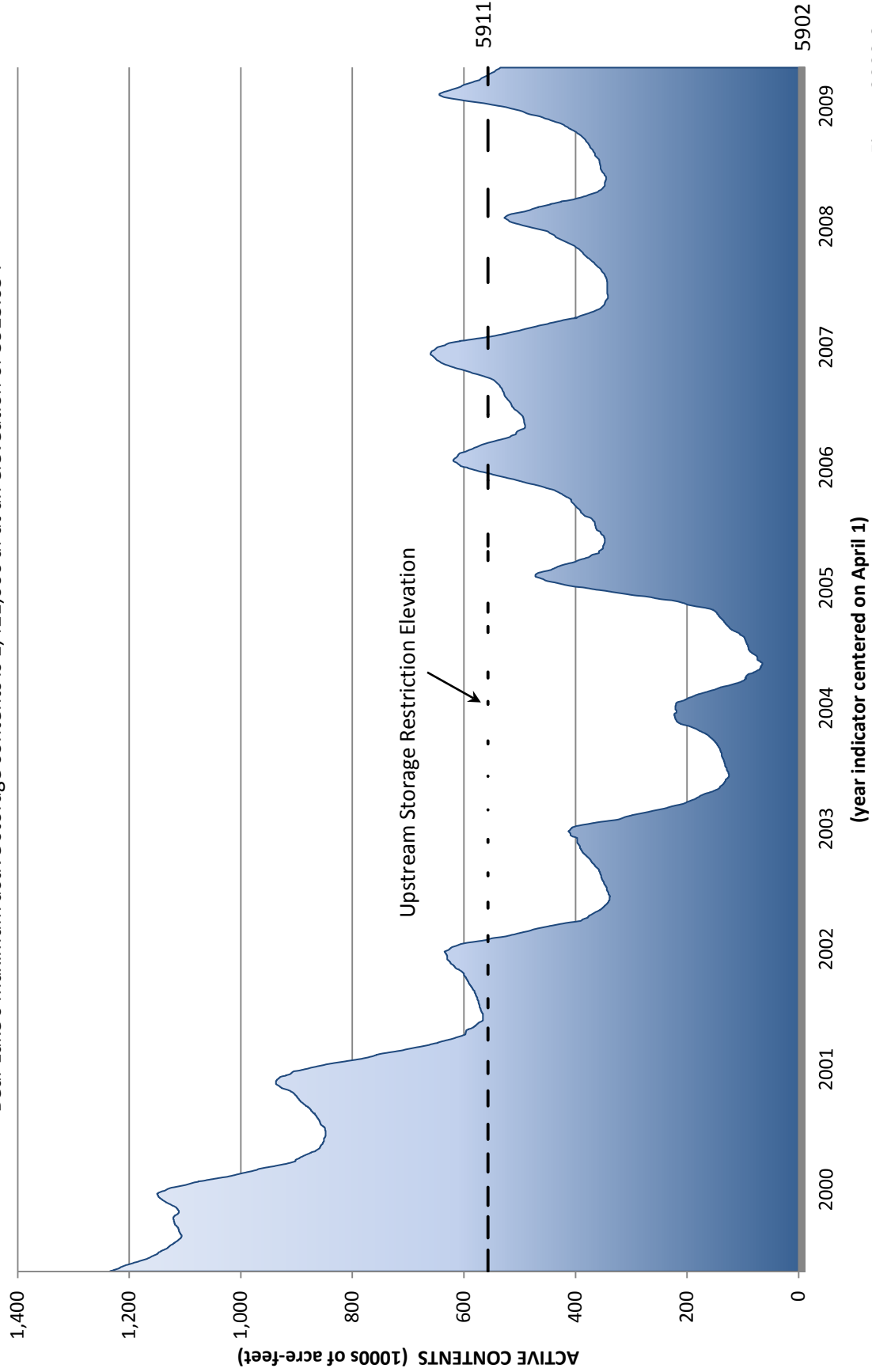


Figure 2009.8

STREAMFLOW DISTRIBUTION

General

The water administration in 2009 in the three divisions remained similar to prior years. There were no changes to the River Commissioners/Watermasters in each of the sections from the previous year. Jack A. Barnett continued to serve as Engineer-Manager of the Bear River Commission. Each River Commissioner/Watermaster works under the direction of the respective State Engineers' offices, but coordinates with the Commission's Engineer-Manager with regard to total diversions in each of the various sections as defined by the Compact.

During the 2009 irrigation season, the following River Commissioners/Watermasters measured water in their sections of the river:

<u>DIVISION</u>	<u>SECTION</u>	<u>RIVER COMMISSIONER/ WATERMASTER</u>
<u>Upper:</u>	Upper Utah	Don Shoemaker
	Upper Wyoming	Don Shoemaker
	Lower Utah	Ron Hoffman
	Lower Wyoming	Mike Johnson
<u>Central:</u>	Wyoming	Mike Johnson
	Idaho	Rock Holbrook
<u>Lower:</u>	Idaho	Rock Holbrook
	Utah	Jim Watterson

Water supply forecast information early in 2009 showed probability of a wet year. This turned out to be the case. The 2009 water year was notably above normal and there was a sufficient supply of water available in all divisions. There were no requests for declaration of water emergencies in any division.

Upper Division

The Upper Division divertible flow, as defined by the Compact, consists of a summation of the diversions of all of the canals in the four sections, plus waters bypassing Pixley Dam, less that portion of water diverted by the canals which is attributable to storage releases from Whitney, Sulphur Creek and Woodruff Narrows Reservoirs. The Compact provides that when the total divertible flow is less than 1250 cfs, a water emergency exists. In recent years, as the irrigation season begins, the divertible flow, as defined by the Compact, has been less than 1250 cfs. However, by early May 2009, when there began to be a demand for water, the divertible flow went well above the 1250 cfs water emergency threshold and, as can be seen, remained there until mid-July when the irrigation demand had reduced. The magenta dashed lines on Figures 2009.9 and 2009.10 show the Wyoming and

Utah allocations for the Upper Wyoming Section and the Lower Utah Section at times when the divertible flow was less than 1250 cfs. Once the total divertible flow dropped below 1250 cfs in mid-July, the flows in the Upper Wyoming Section were such that the river was almost self regulating and the users did not request the declaration of water emergency.

During years when a water emergency has been declared, the regulation of the river is based on the weekly diversions as called in by the respective River Commissioners. At the end of each year, these River Commissioners submit to their respective State Engineers a complete written report of water deliveries. It is this information which is presented in the graphs and tables on the following pages and not the weekly totals called in during times of regulation. The weekly call-in totals, which are received during the irrigation season, differ slightly from the year-end data because of timing of call-ins and call-outs, shifts on canal ratings and other factors.

Figure 2009.11 (pages 09-15 through 09-19) represents a compilation of each of the canal diversions during 2009 in the Upper Division, based on year-end River Commissioners'/Watermasters' reports. The data are displayed with one month's data per page. Totals of the canal diversions for each of the sections are shown below each section. These totals show all water delivered to each canal and, therefore, include storage water. The summary boxes at the bottom of each page show divertible flow and allocations for each section of the Upper Division. It is important to note that the divertible flow, as defined by the Compact, consists of only natural flow diversions. The values for the individual canals represent total diversions, which include both natural flow and storage water. Therefore, storage uses out of Whitney, Sulphur Creek, and Woodruff Narrows Reservoirs have been subtracted from the total diversion amounts for the respective sections so that the totals tabulated in the box at the bottom of each page represent divertible flow as defined by the Compact. A positive number indicates the reservoir was releasing the shown value. A negative value shown for Woodruff Narrows storage indicates the reservoir was storing the indicated value. A negative value shown for storage in Woodruff Narrows Reservoir represents the amount of water which needs to be added into the total divertible flow for any given day, as this is water which would otherwise be available for diversion in the Lower Utah and Lower Wyoming Sections.

The flow at the Pixley gage is reported in Figure 2009.17 (page 09-38). Water users above the Pixley Dam, which are users in the Upper Division, are entitled to divert all of the flow of the river above Pixley Dam. When flows of significant magnitude pass Pixley, it is most often because there is more natural flow in the Upper Division than is needed. As can be seen from Figure 2009.17, there were significant flows past the Pixley gage during the irrigation season of 2009. These flows augmented the water supply available to the Central Division.

2009 - UPPER DIVISION Upper Wyoming Section Diversion vs Allocation

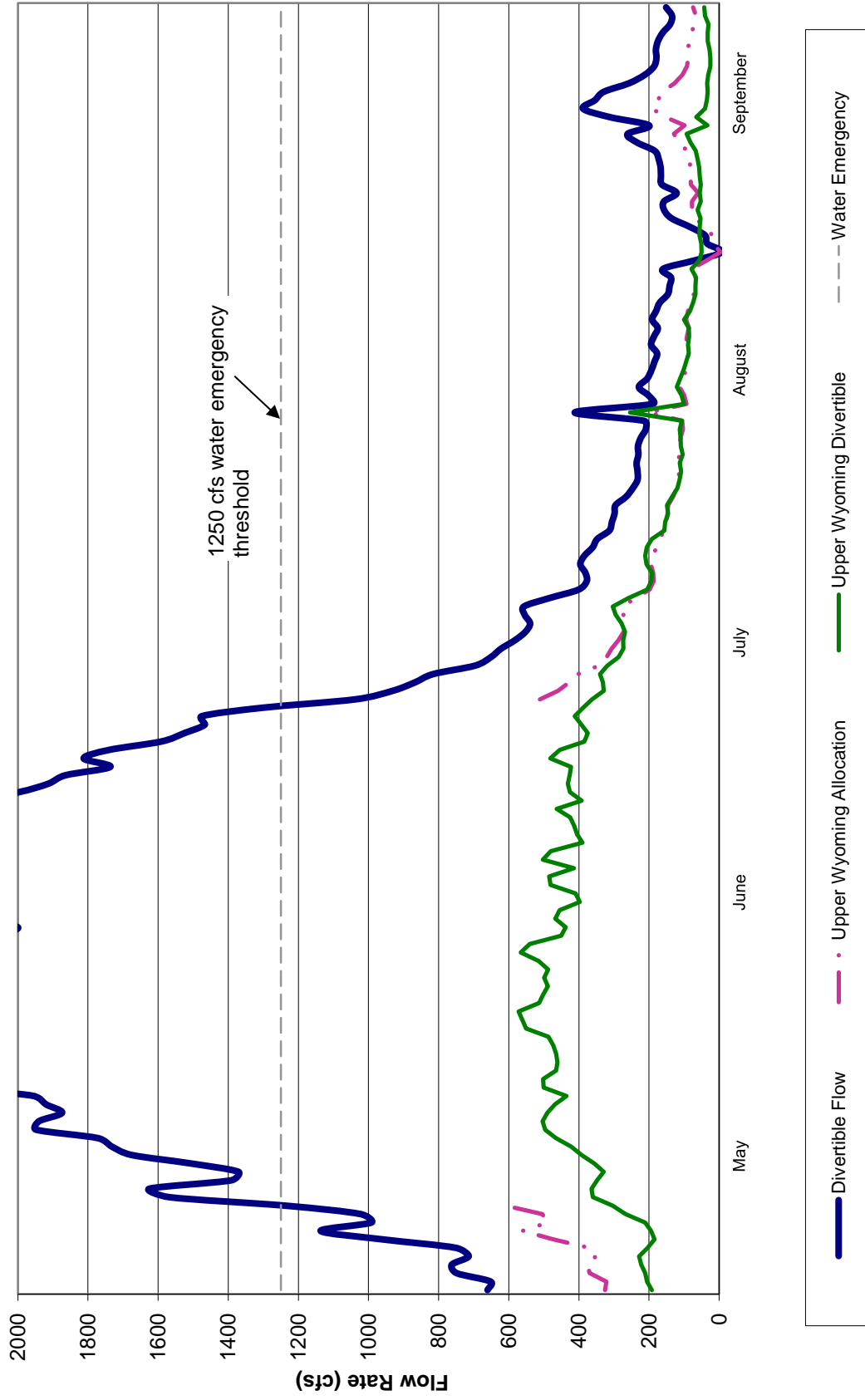


Figure 2009.9

**2009 - UPPER DIVISION
Lower Utah Section Diversion vs Allocation**

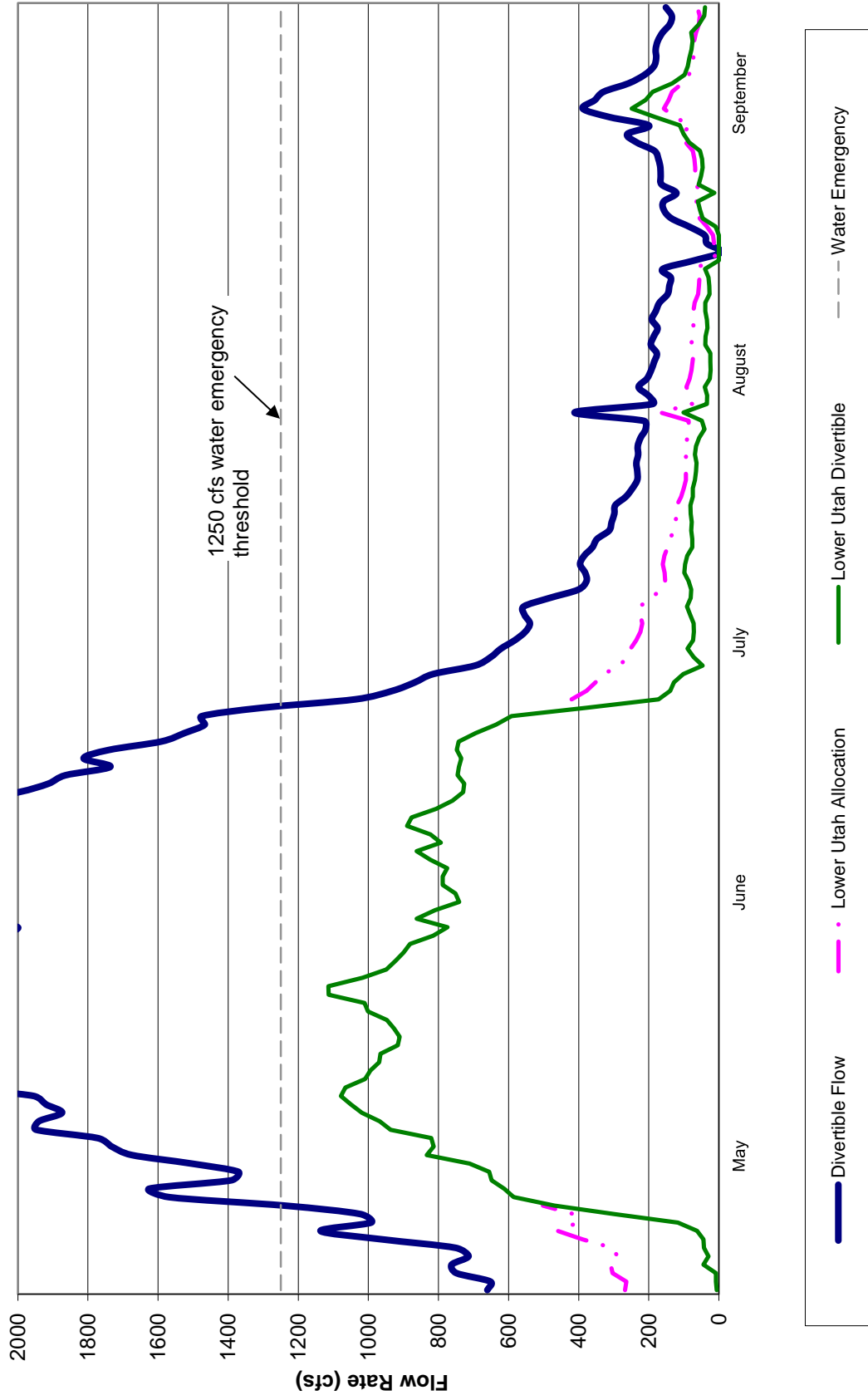


Figure 2009.10

2009

DAILY DISCHARGE IN CFS OF BEAR RIVER CANALS WITH COMPACT ALLOCATIONS IN THE UPPER DIVISION

September

Table with columns for dates 1-30 and Total. Rows include: UPPER UTAH SECTION (Hovarka, Hatch), UPPER WYOMING SECTION (Hilliard, Lannon, Hilliard West Side, Bear, Tropic, Kreider, Danielson, Crown & Pine Grove, McGraw, Lewis, Homer, Lewis and Blanchard, Myers No. 2, Hare, Coffman, Knoder, Myers No. 1, Evans Irr, Evanston Pipeline, Booth, Anel Irr, Cornelison, Ev Water Supply, Knight No. 2, State Hospital Ditch, Evanston Water, Wilson Irr, Faulkner, Rocky Mtn & Blyth, B.E.A.R. Project PL, Fife Irr, Johnston & Narramore, Fritz, Bruce-Barton, A.W. Sims, Junction, Morgansson, Feasins Irr, John Sims, Michael Sims, S. P., Almy, Sims, Blight & Turner, Bowns, Nixon West Side, Turner, Chapman (Headgate), Chapman (Stalineine), Morris Bros Irr, Bowns & Bruce, Olson No. 1 Pump, Francis-Lee, Bear River Canal, TOTAL UPPER WY DIV., Whitney Storage, Sulphur Creek Storage), LOWER UTAH (Neville, Booth, Rees Land & Livestock, Crawford-Thompson, Randolph-Woodruff, Dykens, Lazy P Ranch Pump, Randolph-Sage Creek, Hoffman Brothers Ranch Pump, McMinn, Enberg, BQ Westside, Burdette Weston Pump, Adams Pump, TOTAL LOWER UT DIV., Woodruff Narrows Storage Release), LOWER WYOMING (Johnson Pipelines, Weston Ranch Pump, McFarland, B.Q. Dam Slough, B.Q. Dam East, Pixley Irr (East), Pixley Irr (West), C-12 Pipeline and Pivot, TOTAL LOWER WY DIVERSIONS), Bear River below Pixley Dam, Total Divertible Flow, Upper UT Allocation, Upper UT Divertible, Upper WY Allocation, Upper WY Divertible, Lower UT Allocation, Lower UT Divertible, Lower WY Allocation, Lower WY Divertible.

NOTE:

"Chapman (Stalineine)" is a second measurement of flows in the Chapman Canal. As such, the values are not re-added into the Upper Wyoming total. Whitney and Sulphur Creek Reservoirs supply storage to irrigators in the Upper Wyoming Section. Woodruff Narrows storage is credited 83% to the Lower Utah Section, Bear River and Francis Lee Canal irrigators, and 17% to Wyoming irrigators.

Figure 2009.11 (cont.)

Central Division

The Compact provides that a water emergency may be declared when the divertible flow in the Central Division drops below 870 cfs. A water emergency may also be declared in the Central Division if the flow rate at the Border Gage drops below 350 cfs. The Compact provides that once a water emergency is deemed to exist, the State of Wyoming is to be restricted to 43 percent of the total divertible flow. The remaining 57 percent is available for use within Idaho.

Figures 2009.12 and 2009.13 graphically illustrate the Central Division's divertible flow and the respective allocations and diversions by the Wyoming and Idaho Sections under a water emergency. The flow past the Border Gage is not illustrated on these figures, as it never impacted river regulation this year. It is important to note that on Figure 2009.13, the line labeled as "Available to Idaho" represents the summation of diversions within the State of Idaho, as well as flow passing Stewart Dam and diversion to the Rainbow Inlet Canal. As the Compact provides that 57 percent of the Central Division's divertible flow shall be available for use within Idaho, this line is used to show whether such provision of the Compact was met. However, the Compact also provides that if Idaho elects to not divert into its canals its full entitlement, a portion of its allocation can pass into the Lower Division via the Rainbow Inlet Canal or Stewart Dam. Data for this hydrograph are based on the River Commissioners'/Watermasters' annual reports to their respective state water agencies.

Figure 2009.14 (pages 09-23 through 09-27) shows a compilation of daily canal diversions as provided by the respective River Commissioners'/Watermasters. The Wyoming and Idaho Sections' diversions and allocations are tabulated and summarized at the bottom of each page. The pages are divided such that there is one month's data per page. As the flow of the Bear River at the Border Gage could also be critical to the declaration of a water emergency, as defined by the Compact, this gage's data are also shown in these tables.

As can be seen on the graphs and from the data, 2009 was a good water year in the Central Division. The divertible flow was above the minimum water emergency trigger of 870 cfs from early May until mid-July. There was not a request for the declaration of a water emergency and administration under the Compact. As can be seen on Figure 2009.12, even if a water emergency had been declared, the Wyoming diversions were below what would have been its allocation.

2009 - CENTRAL DIVISION

Wyoming Section Diversion vs Allocation

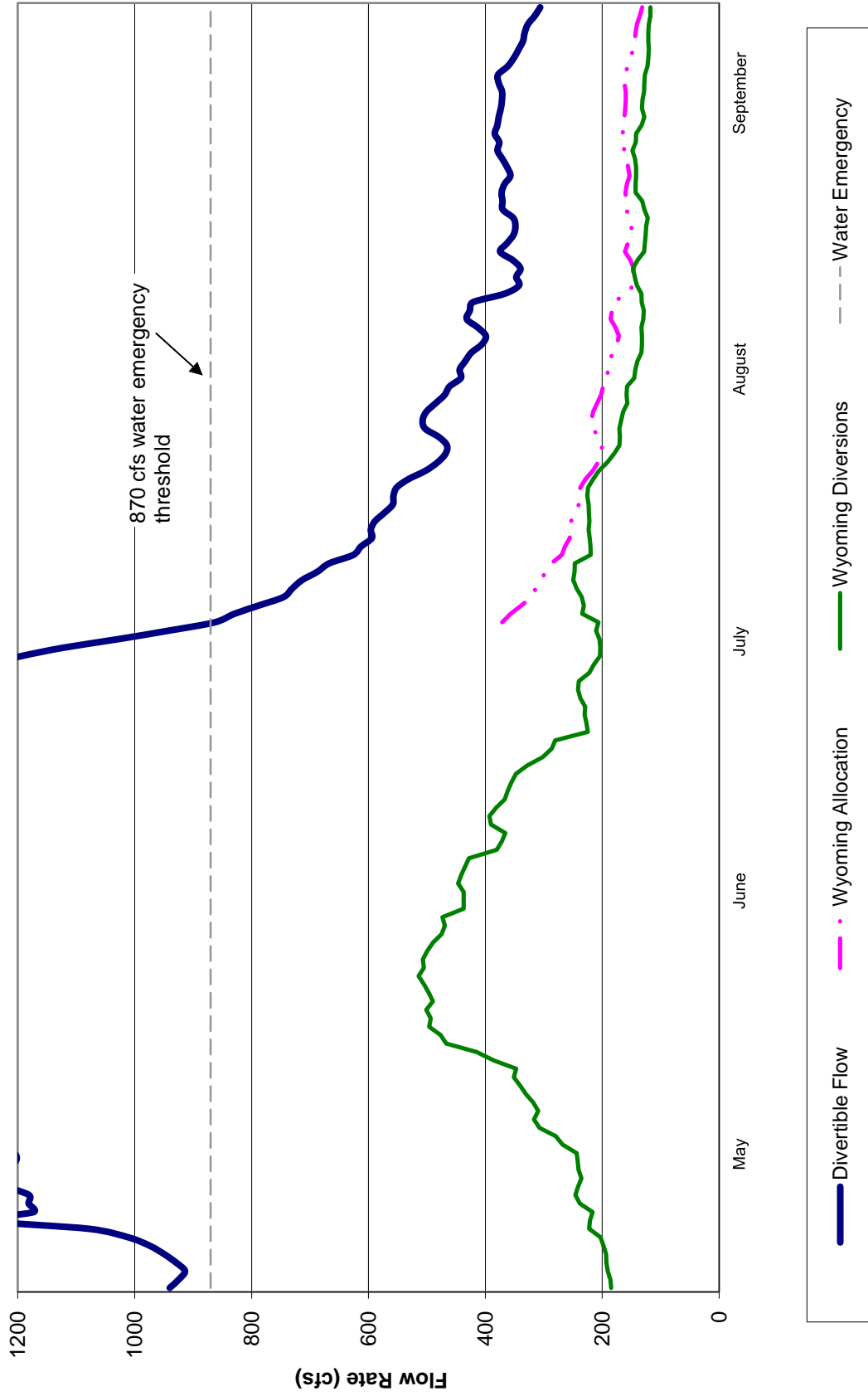


Figure 2009.12

2009 - CENTRAL DIVISION

Idaho Section Diversion vs Allocation

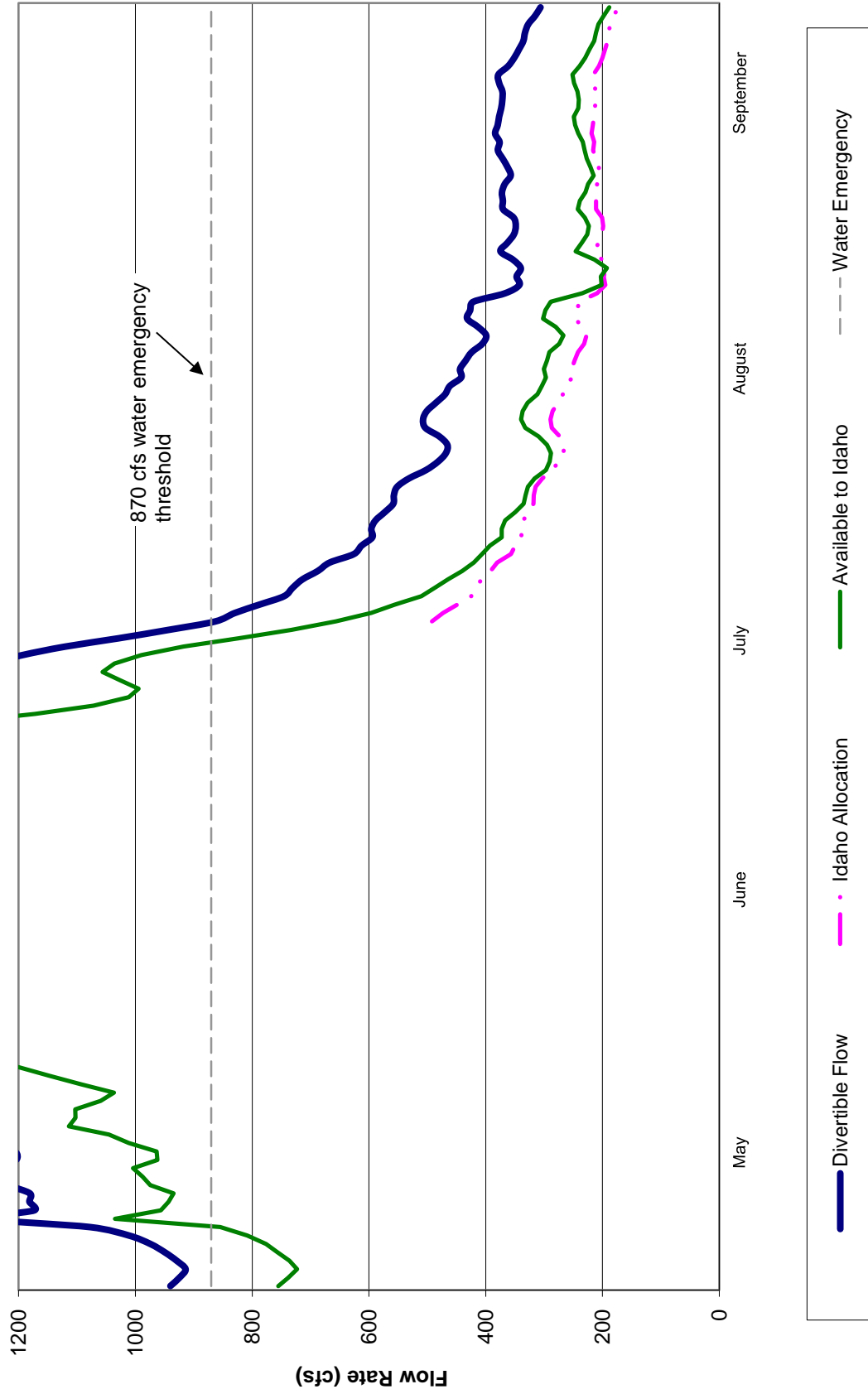


Figure 2009.13

DAILY DISCHARGE IN CFS OF BEAR RIVER CANALS WITH COMPACT ALLOCATIONS IN THE CENTRAL DIVISION

Table with columns for date (1-31), month (August), and various diversion names including WYOMING DIVERSIONS, BEAR RIVER CANALS, TRIBUTARY DIVERSIONS, SMITHS FORK DIVERSIONS, IDAHO DIVERSIONS, and TOTAL DIVERTIBLE FLOW.

NOTE: Wyoming is limited to 43% of the total divertible flow. The remainder of the divertible flow is available for use within Idaho.

Figure 2009.14 (cont.)

Lower Division

The Compact provides that a Utah Lower Division water user can petition the Commission for interstate regulation if he believes that he is being deprived of water to which he is justly entitled due to diversions in Idaho. If, upon review, the Commission finds such to be the case, then the Compact provides for the declaration of a water emergency and that it shall put into effect water delivery schedules based on priority of rights without regard to the state line. The Commission has never received such a petition. However, with growing concern for such a possibility, the Commission, over a several year period, determined how it would receive and review such a petition and implement water delivery should a water emergency be declared. At its November meeting in 1997 the Commission adopted *Interim Procedures for Lower Division Water Delivery*. Appendix B to the procedures, which was revised with the procedures in April, 2004, provides for the accounting and distribution method to be used in a water emergency.

Also appended to the procedures is *Water Delivery Schedule No. 1* which was revised by the Commission in 2006 and which includes the mainstem Lower Division water rights in both Idaho and Utah. After adoption of the water delivery schedule, both states began using this common schedule of water rights in their water right accounting programs. Hence, though not regulated by the Commission, the distribution in the Lower Division is cooperatively managed by the states of Idaho and Utah through their respective Watermasters and River Commissioners. Such distribution was facilitated in 2009 with weekly conference calls with the state agencies, large water users and PacifiCorp. Figure 2009.15 shows the delivery of water in the Lower Division as reported by the two state agencies.

2009 Lower Division Irrigation Water Deliveries

Canal/Group	Natural Flow (af)	Storage Use (af)	Total Diversion (af)
Idaho			
Gentile Valley	10,159	---	10,159
West Cache	38,826	698	39,524
Cub River Pumps	4,465	5,146	9,611
Last Chance and Bench B	65,308	240	65,548
Idaho Small Irrigators	7,999	1,046	9,045
Utah			
Bear River Canal Company	202,872	31,262	234,134
Utah Small Irrigators	3,578	3,350	6,928

Figure 2009.15

Allocation and deliveries of Bear Lake storage water are significant in most years to the total water diverted in the Lower Division. In 1995, PacifiCorp, the irrigators and Bear

Lake interests entered into a settlement agreement as to the allocation of storage water from Bear Lake. In 2004 the parties entered into an *Amended and Restated Bear Lake Settlement Agreement*. PacifiCorp tracks deliveries pursuant to the settlement agreement. Figure 2009.16 shows such deliveries in 2009.

2009 Bear Lake Storage Deliveries

Irrigation Storage Allocation	209,000 af
Bear Lake Storage Release	42,487 af
Lake Recovery Volume	166,513 af
Decreed Transit Losses	1,530 af
System Losses ¹	7,205 af
Delivered Bear Lake Storage	33,752 af

¹Water that passes below Cutler Dam that is accounted for as storage water release.

Figure 2009.16

As can be seen from the above data, storage use in 2009 was only a fraction of the allocation and the unused water aided significantly in the lake recovery.

STATE WATER ACTIVITIES

Article XI of the Amended Compact provides that applications for appropriation or change in water use within each state shall be in accordance with individual state law, except no such application shall be approved if the effect will deprive water users within another state or increase the depletion beyond that which is provided for under the Compact. This article further requires that state officials report, in a format and at intervals established by the Commission, the status of their respective allocations and uses. The Commission has determined the best format for reporting such changes in use is the Biennial Report. Figure 0.3 in the Overview section of this report provides the most recent depletion information. This portion of the Biennial Report provides a summary of major water and water right related activities in each of the states during the 2009 water year.

Idaho

Water Activities

Local water users received a grant of \$3.8 million under the ARRA program through the Bureau of Reclamation for improvements to be made within their systems. A portion of this water was passed on to Water District 11 for improvements to water measuring. The grant required matching funds. The total project cost is \$8 million. The project includes the installation of 30 measuring devices and real-time monitoring on 19 diversions. In addition, 34 miles of ditch will be converted to pipeline and 450 feet of canal will be lined. Franklin County Soil and Water Conservation District will act as the grant administrator. All projects must be completed by December 31, 2010.

Measuring devices were installed on 16 Bear River pump diversions through 2009 pursuant to an IDWR water measurement order issued to pump owners in February 2008. The order was issued for 25 pumps. Three of the 25 pumps have not been used, thereby bringing the rate of compliance to 72% through 2009. IDWR staff calibrated about ten meter installations through 2009 (2008 and 2009 combined).

Water Rights

In Basin 11 two stockwater permits and one domestic and stockwater permit were issued for 0.02 cfs each. The sources of two of the permits are springs. In Basin 13, two permits totaling 0.06 cfs were issued for domestic use from springs, and one application to divert 2.0 cfs from Wayland Hot Springs for power generation was filed. In Basin 15, the Malad drainage, three water right permits were issued and eight applications were filed. The three permits were for irrigation and domestic purposes from groundwater for a total of 4.01 cfs. The eight applications filed are all for irrigation from groundwater and totaled 15.1 cfs.

Utah

Water Activities

A preliminary engineering report for the Washakie Reservoir site was completed. The reservoir would have a capacity of about 160,000 acre-feet. The preferred alternative would be to build a three-sided embankment on the north, west and south sides of the reservoir. This configuration would allow the existing railroad to stay in place, but the Malad River would need to be directed around the west embankment through a constructed channel.

A right-of-way study to move water from the Washakie Reservoir site to Weber Basin Water Conservancy District's Slaterville Diversion west of Ogden is being conducted. After an initial 1,700 possible pipeline routes were produced, an engineering firm is analyzing several of those options based on both cost and non-cost factors. The report should be completed in the summer of 2010.

A cloud seeding project to increase snowpack has been ongoing since 1989 in the Lower Division in eastern Box Elder County and Cache County. The winter storm systems in these areas are being seeded with ground-based generators using silver iodide. Bear River Water Conservancy District and Cache County cost shared (50/50) with the Utah Board of Water Resources in the cloud seeding project during the 2009 water year.

Water Rights

There were 48 applications to appropriate that were approved in Utah during 2009 for groundwater for "ordinary domestic and stockwatering" purposes and associated irrigation use for 46 homes. There were also seven applications to appropriate approved for stockwatering 1354 livestock.

In the Upper Division, in Rich County, there were four applications to appropriate that were approved for irrigation of a total of 281.39 acres. In the Lower Division, in Box Elder County below Cutler Dam, eight applications to appropriate were approved for irrigation of a total of 373.61 acres.

Change applications were also approved to change the nature and/or place of use of historic water rights. Notably, Bear River Canal Company and others in Box Elder County were approved changes in place of use of their water rights to facilitate changes in land use. Permanent changes were also approved for several irrigation companies in Rich County to facilitate changes in place of use to cover lands above canals, many of which had been irrigated for many years. A temporary change application was approved for Logan and Northern Irrigation Company in Cache County in response to a tragic landslide and canal failure so as to continue irrigating from other sources and diversions, including groundwater.

Wyoming

Water Activities

The cool, moist conditions in spring 2009 helped make this as close to an average water year as one can expect. As Wyoming operates on a biennial budget, the FY2009-10 fiscal year began July 1, 2009. The State Engineer's Office was successful in securing significant funding to expand the state-operated data collection program, including new diversion data recording and transmitting sites in the Bear River. The Division Four staff is acquiring much skill in the installation and troubleshooting of this equipment; their expertise is of great benefit to the Bear River basin, as well as the entire state of Wyoming. Questions have been raised by Wyoming shareholders about expanded use of Woodruff storage shares.

Water Rights

New water right permits with Compact depletions issued from Wyoming's allocation are as follows:

<u>Permit No.</u>	<u>Appropriator</u>	<u>Depletion Allocation</u>	<u>Priority Date</u>
U.W. 186878	Greg Nate	8.04 acre-feet	Feb. 1, 2008
U.W. 188821	Robert D. Jeppson	10.40 acre-feet	Sept. 2, 2008
U.W. 189738	Uinta Co. WY & State Parks and Cultural Resources	7.28 acre-feet	Feb. 8, 2009
34035	Erick W. and Jeanne M. Esterholdt	0.41 acre-feet	Jan. 29, 2008
34073	Don D. Failoni - Failoni Land and Livestock	0.18 acre-feet	June 6, 2008
34074	Don D. Failoni - Failoni Land and Livestock	0.35 acre-feet	June 6, 2008
34075	Don D. Failoni - Failoni Land and Livestock	0.17 acre-feet	June 6, 2008
34100	Roland C. and Linda L. Willis and State Board of Land Commissioners	165.86 acre-feet	Feb. 27, 2007

STREAM GAGING

As was indicated in the "Overview" chapter of this report under the subsection concerning the "Stream Gaging Program" (see page O-14), the Bear River Commission participates in a cooperative contract with the USGS for the maintenance of stream gages on the Bear River and significant tributaries. Also, the states, PacifiCorp and, at times, others participate in stream gaging on the Bear River and its tributaries. The Commission believes the collection of data concerning stream flows in the Bear River system is very important and allocates about half of its annual budget in support of the cooperative stream gaging program with the U.S. Geological Survey. However, costs continue to increase and so the Commission is constantly reviewing the stream gaging program to determine if all of the stations supported are necessary for the Commission to help the Commission fulfill the responsibilities assigned to it by the Compact. In 2009, the Bear River near UT-WY state line gage became part of the NSIP and was no longer funded by the Commission.

During 2009, a total of 32 gages were maintained on the Bear River system. Of these 32 gages, eight were part of a cooperative effort between the Bear River Commission and the USGS and the USGS funded four gages under NSIP. PacifiCorp maintained 15 gages on the Bear River system during 2009. Four additional gages were maintained under the USGS Cooperative Program with the State of Utah (3 gages) and the State of Idaho (1 gage). Additionally, the State of Wyoming maintained one gage on the Bear River. Figure 2009.17 shows a tabulation of these gages and the entities which participated in the operation and funding of each gage. The approximate locations of the stream gages are shown on Figure O.5 in the Overview section of this report.

Publication of the streamflow records for 12 of the gages in this report were considered to be of significant value to the Commission and are included on pages 09-35 through 09-47.

BEAR RIVER SYSTEM STREAM GAGING STATIONS

STREAM GAGES MAINTAINED DURING THE 2009 WATER YEAR

STATION #	STATION NAME	OPERATED BY	MEASUREMENT FUNDED BY	PUBLICATION FUNDED BY
<u>10011500</u> ¥	Bear River near UT-WY state line	USGS	USGS	USGS
10016900¥	Bear River at Evanston WY	USGS-WY	USGS	USGS
<u>10020100</u> ▲	Bear River above reservoir near Woodruff UT	USGS	BRC/USGS	BRC/USGS
<u>10020300</u> ▲	Bear River below reservoir near Woodruff UT	USGS	BRC/USGS	BRC/USGS
10023000▲	Big Creek near Randolph UT	USGS	UTDNR/USGS	UTDNR/USGS
10026500▲	Bear River near Randolph UT	WY	State of WY	WSE/WY-USGS
<u>10028500</u> *▲	Bear River below Pixley Dam near Cokeville WY	USGS	BRC/USGS	BRC/USGS
<u>10032000</u> ▲	Smiths Fork near Border WY	USGS	BRC/USGS	BRC/USGS
10038000¥	Bear River below Smiths Fork near Cokeville WY	USGS	USGS	USGS
<u>10039500</u> ¥	Bear River at Border WY	USGS	BRC/USGS	BRC/USGS
10044300	Dingle Inlet Canal near Dingle ID	PacifiCorp	PacifiCorp	not published
<u>10046000</u>	Rainbow Inlet Canal near Dingle ID	PacifiCorp	PacifiCorp	PacifiCorp
10046500 ¹	Bear River below Stewart Dam near Montpelier ID	PacifiCorp	PacifiCorp	not published
<u>10055500</u>	Bear Lake at Lifton near St. Charles ID	PacifiCorp	PacifiCorp	PacifiCorp
<u>10059500</u>	Bear Lake Outlet Canal near Paris ID	PacifiCorp	PacifiCorp	PacifiCorp
10068500▲	Bear River at Pescadero ID	USGS	IDDNR/USGS	IDDNR/USGS
10075000	Bear River at Soda Springs ID	PacifiCorp	PacifiCorp	PacifiCorp
10079000	Soda Point Reservoir at Alexander ID	PacifiCorp	PacifiCorp	PacifiCorp
10079500	Bear River at Alexander ID	PacifiCorp	PacifiCorp	PacifiCorp
10080000	Bear River below Grace Dam near Grace ID	PacifiCorp	PacifiCorp	PacifiCorp
10086000	Oneida Narrows Reservoir at Oneida ID	PacifiCorp	PacifiCorp	PacifiCorp
10086500	Bear River below PacifiCorp Tailrace at Oneida ID	PacifiCorp	PacifiCorp	PacifiCorp
<u>10092700</u> ▲	Bear River at ID-UT state line	USGS	BRC/USGS	BRC/USGS
10105900▲	Little Bear River at Paradise UT	USGS	UTDNR/USGS	UTDNR/USGS
10108400	Logan, Hyde Park, Smithfield Canal near Logan UT	USGS	UTDNR/USGS	UTDNR/USGS
<u>10109000</u> ²	Logan River above State Dam near Logan UT	USGS	BRC/USGS	BRC/USGS
10113500¥	Blacksmith Fork above Upper & Lower Dam Near Hyrum UT	USGS	USGS	USGS
10116500	Cutler Reservoir near Collinston UT	PacifiCorp	PacifiCorp	PacifiCorp
10117000	Hammond (east side) Canal near Collinston UT	PacifiCorp	PacifiCorp	PacifiCorp
10117500	West Side Canal near Collinston UT	PacifiCorp	PacifiCorp	PacifiCorp
10118000	Bear River near Collinston UT	PacifiCorp	PacifiCorp	PacifiCorp
<u>10126000</u> ▲	Bear River near Corinne UT	USGS	BRC/USGS	BRC/USGS

- ▲ Stations which are equipped with DCPs.
- * Seasonal stations
- ¥ NSIP site

Note: Underlined station numbers indicate those gages for which stream flow data is published in this report.

¹ Discharge measurements below Stewart Dam are required for interstate regulation pursuant to the Compact. However, flow is general only a few cfs. PacifiCorp maintains this gage and reports discharge to the Idaho watermaster. The data are included with the Central Division's canal diversion data herein.

² Gage 10109001 represents a summation of the Logan River discharge (10109000) and canal diversions (10108400) upstream of the gage. Gage 10109000 is part of the cooperative program with the USGS and the BRC, while gage 10108400 is maintained under the USGS cooperative program with the State of Utah. Of importance to the Commission, and published herein, is the combined flow of these two gages.

Figure 2009.17

10011500 BEAR RIVER NEAR UTAH-WYOMING STATE LINE

LOCATION.--Lat 40°57'55", long 110°51'10" referenced to North American Datum of 1927, in SE ¼ NW ¼ SE ¼ sec.30, T.3 N., R.10 E., Summit County, UT, Hydrologic Unit 16010101, on left bank 400 ft downstream from West Fork and 2.8 mi upstream from Utah-Wyoming State line.

DRAINAGE AREA.--172 mi².

PERIOD OF RECORD.--July 1942 to current year.

REVISED RECORDS.--WDR UT-74-1: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 7,965 ft above NGVD of 1929, from river-profile map. Prior to October 1, 1986 at datum 3.0 ft lower.

REMARKS.--Records good except for estimated daily discharges, which are poor. Flow regulated slightly by Whitney Reservoir, total capacity, 4,700 acre-ft since 1966. Three diversions above station for irrigation of about 265 acres above and 2,600 acres below station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,230 ft³/s, Jun 6, 1986, gage height, 4.05 ft, datum then in use; minimum, 6.8 ft³/s, Apr 12, 1984, result of upstream ice jam.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,100 ft³/s and (or) maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 20	0230	*1,800	*6.49

Minimum daily discharge, 22 ft³/s, Mar 11.

DISCHARGE, CUBIC FEET PER SECOND WATER YEAR OCTOBER 2008 TO SEPTEMBER 2009 DAILY MEAN VALUES

[e, estimated]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	47	45	45	e30	e36	e36	37	343	978	574	97	85
2	46	49	42	e34	e34	e38	40	382	1,050	610	106	88
3	45	56	46	e28	e34	e40	42	390	1,060	677	101	92
4	49	55	40	e24	e36	e30	39	382	1,060	543	94	92
5	63	46	e38	e28	e42	e29	44	405	955	474	91	102
6	61	45	e42	e34	e44	e26	43	541	870	416	105	119
7	54	51	47	e38	e44	e25	49	693	792	385	99	115
8	51	54	38	e38	e42	e28	55	740	657	351	92	112
9	49	51	e34	e36	e42	e26	50	672	689	312	91	116
10	49	52	e42	e34	e40	e24	47	650	747	288	86	114
11	51	52	47	e38	e38	e22	50	775	715	271	82	111
12	50	52	45	e40	e38	e24	49	973	613	261	76	109
13	46	54	42	e38	e36	e26	54	926	639	250	74	107
14	47	45	e34	e36	e34	e30	67	785	648	235	78	112
15	54	45	e36	e34	e36	e34	69	829	585	215	92	119
16	52	54	e32	e34	e40	e40	56	899	567	197	91	88
17	52	50	e26	e32	e44	e44	55	1,060	691	182	76	92
18	51	49	e28	e32	e42	e44	60	1,320	935	172	74	90
19	50	49	e32	e32	e40	e50	79	1,530	765	164	70	87
20	48	46	e30	e34	e36	e55	110	1,540	812	160	67	107
21	48	43	e32	e34	e38	e55	162	1,400	977	149	64	89
22	38	38	e36	e38	e42	e50	225	1,310	777	149	61	79
23	41	44	e28	e40	e46	e40	307	1,100	752	163	61	77
24	45	37	e28	e42	e46	e39	378	1,180	777	162	68	75
25	44	45	e34	e40	e48	43	353	1,120	775	170	64	74
26	45	46	e30	e38	e46	41	273	1,010	973	169	69	72
27	43	47	e26	e36	e42	40	237	987	862	165	85	74
28	43	43	e30	e38	e34	52	234	978	756	153	83	79
29	44	44	e34	e36	---	42	260	1,000	684	147	82	77
30	42	47	e30	e34	---	38	302	977	618	145	80	87
31	45	---	e28	e36	---	43	---	992	---	122	80	---
Total	1,493	1,434	1,102	1,086	1,120	1,154	3,826	27,889	23,779	8,431	2,539	2,840
Mean	48.2	47.8	35.5	35.0	40.0	37.2	128	900	793	272	81.9	94.7
Max	63	56	47	42	48	55	378	1,540	1,060	677	106	119
Min	38	37	26	24	34	22	37	343	567	122	61	72
Ac-ft	2,960	2,840	2,190	2,150	2,220	2,290	7,590	55,320	47,170	16,720	5,040	5,630

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1943-2009, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	64.3	54.5	45.9	41.5	39.7	43.7	112	606	830	292	92.6	73.8
Max	208	106	94.9	72.4	64.3	69.0	316	1,044	1,990	1,105	244	229
(WY)	(1983)	(1984)	(1984)	(1984)	(1984)	(1986)	(1946)	(1984)	(1986)	(1995)	(1965)	(1983)
Min	30.8	32.5	27.7	28.9	21.1	26.0	37.2	162	204	67.4	31.0	23.9
(WY)	(1959)	(1955)	(1960)	(2007)	(2003)	(1964)	(1944)	(1977)	(1992)	(1961)	(2002)	(1956)

Figure 2009.17 (cont.)

10020100 BEAR RIVER ABOVE RESERVOIR, NEAR WOODRUFF, UT

LOCATION.--Lat 41°26'04", long 111°01'01" referenced to North American Datum of 1927, in NE ¼ NW ¼ NW ¼ sec.29, T.17 N., R.120 W., Uinta County, WY, Hydrologic Unit 16010101, on right bank 9.3 mi upstream from Woodruff Narrows Dam and 10 mi southeast of Woodruff.
 DRAINAGE AREA.--755 mi².
 PERIOD OF RECORD.--October 1961 to current year.
 REVISED RECORDS.--WDR UT-74-1: Drainage area.
 GAGE.--Water-stage recorder. Elevation of gage is 6,455 ft above NGVD of 1929, from river-profile map.
 REMARKS.--Records good except for estimated daily discharges, which are fair. Diversion for irrigation of about 43,500 acres above station.
 EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,150 ft³/s, Jun 2, 1983, gage height, 6.17 ft; minimum, no flow several days during Aug, Sep 1988, and Sep 2002.
 EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,790 ft³/s, May 21, gage height, 5.10 ft; minimum daily discharge, 9.0 ft³/s, Aug 7.

DISCHARGE, CUBIC FEET PER SECOND WATER YEAR OCTOBER 2008 TO SEPTEMBER 2009 DAILY MEAN VALUES [e, estimated]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	37	20	19	e30	e38	e45	45	439	859	420	24	29
2	32	25	20	e33	e38	e50	43	471	975	400	21	32
3	28	26	28	e33	e38	e65	50	628	1,130	557	14	34
4	25	27	21	e27	e36	e80	66	631	1,020	607	13	32
5	31	31	e25	e26	e36	e100	62	574	970	483	10	33
6	35	30	e16	e26	e36	e85	68	592	857	401	9.7	38
7	36	20	e23	e29	e36	e60	77	817	710	298	9.0	40
8	29	18	e33	e31	e38	e63	104	1,110	674	197	12	35
9	28	26	e28	e32	e38	e60	125	1,120	610	145	12	33
10	30	30	e15	e30	e38	e63	124	1,010	783	115	32	33
11	27	32	e30	e30	e38	e63	133	892	918	92	29	31
12	29	25	e40	e29	e39	e56	170	1,030	812	79	37	33
13	33	24	e44	e32	e39	e64	217	1,200	697	73	32	33
14	31	26	e30	e32	e38	e55	335	1,050	754	64	36	33
15	26	25	e23	e32	e36	e55	549	932	792	58	43	39
16	28	19	e16	e32	e38	e66	508	964	697	46	53	49
17	28	27	e14	e32	e38	e93	335	1,020	635	39	35	38
18	26	33	e12	e32	e38	e139	246	1,170	862	37	32	43
19	23	30	e15	e32	e38	e164	256	1,360	1,240	31	33	51
20	20	25	e17	e32	e39	e205	312	1,590	e975	30	32	54
21	17	24	e18	e34	e40	e316	342	1,700	1,290	25	37	48
22	17	e21	e18	e36	e38	e339	393	1,540	1,470	17	38	49
23	21	e18	e19	e40	e36	e177	461	1,340	1,010	12	34	41
24	20	e16	e22	e40	e38	e116	560	1,140	825	21	35	39
25	23	e16	e19	e42	e39	79	657	1,310	704	27	40	43
26	25	e17	e19	e40	e40	69	618	1,200	705	29	42	38
27	26	e25	e20	e37	e41	58	462	997	1,010	26	33	25
28	22	e27	e18	e34	e42	45	427	913	737	23	30	31
29	19	20	e27	e32	---	63	393	879	595	21	31	31
30	18	15	e30	e34	---	58	397	867	495	25	31	34
31	19	---	e32	e36	---	38	---	822	---	25	31	---
Total	809	718	711	1,017	1,067	2,989	8,535	31,308	25,811	4,423	900.7	1,122
Mean	26.1	23.9	22.9	32.8	38.1	96.4	284	1,010	860	143	29.1	37.4
Max	37	33	44	42	42	339	657	1,700	1,470	607	53	54
Min	17	15	12	26	36	38	43	439	495	12	9.0	25
Ac-ft	1,600	1,420	1,410	2,020	2,120	5,930	16,930	62,100	51,200	8,770	1,790	2,230

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1962-2009, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	67.2	67.9	66.4	63.5	76.9	156	314	787	800	181	47.2	46.2
Max	437	198	181	147	312	627	671	1,957	2,564	1,191	340	288
(WY)	(1983)	(1974)	(1984)	(1984)	(1986)	(1986)	(1969)	(1984)	(1986)	(1995)	(1983)	(1983)
Min	3.03	6.06	7.21	6.76	10.4	26.8	77.7	104	54.6	4.41	0.68	0.49
(WY)	(1965)	(1989)	(1989)	(1989)	(2003)	(1977)	(1977)	(1977)	(1992)	(2000)	(2000)	(1988)

Figure 2009.17 (cont.)

10020300 BEAR RIVER BELOW RESERVOIR, NEAR WOODRUFF, UT

LOCATION.--Lat 41°30'20", long 111°00'50" referenced to North American Datum of 1927, in NE ¼ NE ¼ NW ¼ sec.32, T.18 N., R.120 W., Uinta County, WY, Hydrologic Unit 16010101, on right bank 1,100 ft downstream from Woodruff Narrows Dam, 1.6 mi upstream from Salt Creek, 5.4 mi upstream from Wyoming-Utah State line, and 7.7 mi east of Woodruff.

DRAINAGE AREA.--784 mi².

PERIOD OF RECORD.--October 1961 to current year.

REVISED RECORDS.--WDR UT-74-1: Drainage area.

GAGE.--Water-stage recorder and concrete control. Datum of gage is 6,398.96 ft above NGVD of 1929. Prior to September 26, 1962, at site 175 ft upstream at same datum.

REMARKS.--Records good. Flow regulated by Woodruff Narrows Reservoir (station 10020200) beginning January 1962. Diversions for irrigation of about 43,500 acres above station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,820 ft³/s, Jun 2, 1983, gage height, 8.26 ft; no flow Jul 4, 5, 1962, Aug 30, 31, Sep 1, 2, 6, 7, 1979, Oct 30, 1980.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 1,480 ft³/s, May 21, 22; minimum daily discharge, 13 ft³/s, on many days.

DISCHARGE, CUBIC FEET PER SECOND WATER YEAR OCTOBER 2008 TO SEPTEMBER 2009 DAILY MEAN VALUES

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	30	24	17	16	15	13	13	412	869	525	54	282
2	24	24	17	16	15	13	13	455	972	484	54	283
3	24	24	17	16	15	13	13	520	1,070	496	54	281
4	24	24	17	16	15	13	13	573	1,100	556	54	281
5	24	25	17	16	15	13	13	596	1,060	534	54	280
6	23	25	17	16	14	13	13	574	959	477	55	276
7	23	25	17	16	14	13	13	616	848	398	55	273
8	23	25	17	16	14	13	13	798	783	308	55	272
9	23	25	17	16	14	13	13	966	723	238	60	270
10	23	25	17	16	14	13	13	990	752	189	85	270
11	24	25	17	16	14	13	13	930	855	156	104	268
12	24	25	17	16	14	13	13	901	866	132	104	268
13	24	26	17	16	14	13	13	991	807	108	104	266
14	24	26	17	16	14	13	13	1,050	793	83	104	263
15	24	26	17	16	14	13	13	957	803	65	103	263
16	23	26	17	16	14	13	13	924	780	53	103	262
17	22	26	17	16	13	13	14	936	724	69	102	124
18	22	26	17	16	13	13	14	999	781	66	102	26
19	23	26	17	16	13	13	14	1,160	1,030	55	101	24
20	23	26	17	15	13	13	49	1,340	1,070	40	100	24
21	23	26	17	15	13	13	140	1,480	1,080	37	100	24
22	23	26	17	15	13	13	232	1,480	1,290	47	101	24
23	23	26	16	15	13	13	322	1,380	1,170	55	101	24
24	23	26	16	15	13	13	411	1,230	973	54	102	24
25	23	21	17	15	13	13	554	1,230	834	53	102	24
26	24	18	16	15	13	13	614	1,210	764	54	102	24
27	24	18	16	15	13	13	567	1,100	822	55	102	25
28	24	18	17	15	13	13	485	997	825	54	102	25
29	24	18	16	15	---	13	446	930	719	54	102	25
30	24	17	16	15	---	13	416	905	623	54	102	24
31	24	---	16	15	---	13	---	869	---	54	187	---
Total	733	718	520	484	385	403	4,486	29,499	26,745	5,603	2,810	4,799
Mean	23.6	23.9	16.8	15.6	13.8	13.0	150	952	892	181	90.6	160
Max	30	26	17	16	15	13	614	1,480	1,290	556	187	283
Min	22	17	16	15	13	13	13	412	623	37	54	24
Ac-ft	1,450	1,420	1,030	960	764	799	8,900	58,510	53,050	11,110	5,570	9,520

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1962-2009, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	52.6	49.0	43.3	41.4	43.1	88.2	251	757	944	264	73.5	58.5
Max	425	421	184	153	171	473	891	1,828	2,437	913	331	278
(WY)	(1983)	(1983)	(1983)	(1985)	(1971)	(1972)	(1985)	(1984)	(1983)	(1975)	(1983)	(1983)
Min	3.89	0.12	4.28	4.37	4.71	4.70	0.34	27.8	356	10.5	3.91	3.65
(WY)	(1990)	(1981)	(1978)	(1978)	(1978)	(1978)	(1977)	(1977)	(2002)	(2002)	(1979)	(1979)

Figure 2009.17 (cont.)

10028500 BEAR RIVER BELOW PIXLEY DAM, NEAR COKEVILLE, WY

LOCATION.--Lat 41°56'20", long 110°59'05" referenced to North American Datum of 1927, in SW ¼ SE ¼ SE ¼ sec.25, T.23 N., R.120 W., Lincoln County, WY, Hydrologic Unit 16010102, 800 ft downstream from Pixley Dam, 11 mi south of Cokeville, and 17.5 mi downstream from Twin Creek.

DRAINAGE AREA.--2,032 mi².

PERIOD OF RECORD.--October 1941 to November 1943 (published as Bear River near Cokeville), October 1952 to September 1956, May 1958 to current year (seasonal only). Monthly discharge only for some periods, published in WSP 1314.

REVISED RECORDS.--WDR UT-74-1: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 6,185 ft above NGVD of 1929, from river-profile map. October 31, 1941 to November 30, 1943, at site 200 ft downstream at different datum. September 24, 1952 to August 31, 1994 at site 50 ft downstream at same datum.

REMARKS.--Records fair. Natural flow of stream affected by diversions for irrigation, return flow from irrigated areas, and regulation by upstream reservoirs.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 2,300 ft³/s, Mar 25, 1956; minimum daily discharge, 0.09 ft³/s, Sep 8, 2002.

DISCHARGE, CUBIC FEET PER SECOND WATER YEAR OCTOBER 2008 TO SEPTEMBER 2009 DAILY MEAN VALUES

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	27	---	---	---	---	---	98	316	318	481	63	37
2	26	---	---	---	---	---	96	305	319	406	57	35
3	---	---	---	---	---	---	95	305	309	393	50	32
4	---	---	---	---	---	---	102	319	304	355	46	52
5	---	---	---	---	---	---	107	337	319	345	45	68
6	---	---	---	---	---	---	107	358	337	348	47	72
7	---	---	---	---	---	---	106	373	371	342	47	75
8	---	---	---	---	---	---	106	354	389	358	46	77
9	---	---	---	---	---	---	114	324	417	392	45	75
10	---	---	---	---	---	---	113	274	486	433	46	81
11	---	---	---	---	---	---	108	295	502	453	49	85
12	---	---	---	---	---	---	108	312	470	396	51	84
13	---	---	---	---	---	---	109	279	457	360	49	84
14	---	---	---	---	---	---	126	246	478	317	50	87
15	---	---	---	---	---	---	126	241	528	278	55	86
16	---	---	---	---	---	---	144	248	596	243	60	72
17	---	---	---	---	---	---	139	225	603	222	63	72
18	---	---	---	---	---	---	119	204	602	202	64	75
19	---	---	---	---	---	---	111	171	580	176	64	76
20	---	---	---	---	---	---	111	130	556	162	65	70
21	---	---	---	---	---	---	111	91	549	146	64	59
22	---	---	---	---	---	---	104	85	554	132	60	52
23	---	---	---	---	---	---	102	141	567	107	54	49
24	---	---	---	---	---	---	129	173	586	86	55	48
25	---	---	---	---	---	---	171	212	650	82	55	50
26	---	---	---	---	---	131	216	232	808	82	53	47
27	---	---	---	---	---	124	264	274	808	74	50	44
28	---	---	---	---	---	119	328	381	714	70	45	41
29	---	---	---	---	---	112	332	405	618	71	40	41
30	---	---	---	---	---	106	329	361	548	68	40	53
31	---	---	---	---	---	103	---	322	---	65	39	---
Total	---	---	---	---	---	---	4,331	8,293	15,343	7,645	1,617	1,879
Mean	---	---	---	---	---	---	144	268	511	247	52.2	62.6
Max	---	---	---	---	---	---	332	405	808	481	65	87
Min	---	---	---	---	---	---	95	85	304	65	39	32
Ac-ft	---	---	---	---	---	---	8,590	16,450	30,430	15,160	3,210	3,730

Figure 2009.17 (cont.)

10032000 SMITHS FORK NEAR BORDER, WY

LOCATION.--Lat 42°17'36", long 110°52'18" referenced to North American Datum of 1927, in NE ¼ SW ¼ SW ¼ sec.28, T.27 N., R.118 W., Lincoln County, WY, Hydrologic Unit 16010102, on left bank 4.9 mi upstream from Howland Creek, 5.6 mi downstream from Hobble Creek, and 12.4 mi northeast of Border.

DRAINAGE AREA.--165 mi².

PERIOD OF RECORD.--May 1942 to current year.

REVISED RECORDS.--WSP 1734: 1952(M).

GAGE.--Water-stage recorder. Elevation of gage is 6,720 ft above NGVD of 1929, from topographic map. Prior to October 16, 1945, at site 1.2 mi downstream at different datum. October 16, 1945 to November 1986 at site 0.4 mi downstream at different datum.

REMARKS.--Records good except for estimated daily discharges, which are poor. One diversion for irrigation of about 200 acres above station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,100 ft³/s, Jun 4, 1986, gage height, 5.66 ft; minimum, 19 ft³/s, Feb 28, 2007.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,010, ft³/s, Jun 3, gage height, 3.19 ft; minimum daily discharge, 48 ft³/s, Feb 2, 12, 13, 15.

DISCHARGE, CUBIC FEET PER SECOND WATER YEAR OCTOBER 2008 TO SEPTEMBER 2009 DAILY MEAN VALUES

[e, estimated]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	90	83	80	e75	e50	e57	65	217	911	604	239	143
2	90	89	78	82	e48	60	64	236	939	571	234	141
3	91	93	79	e75	e50	60	65	257	969	564	230	139
4	97	96	75	e65	e50	62	64	280	951	536	227	137
5	97	89	70	e55	e52	60	62	307	933	487	224	136
6	92	88	87	e65	e55	e55	62	330	907	462	223	135
7	91	83	77	e70	e52	e53	66	357	852	444	221	133
8	89	90	75	72	e55	e54	76	367	792	426	220	132
9	88	87	e70	e70	e60	e53	74	361	732	408	216	130
10	89	90	e72	e64	e55	e53	70	362	706	392	210	128
11	92	87	e70	e66	e52	e54	72	389	770	378	204	126
12	94	87	e75	72	e48	e55	78	415	782	374	199	125
13	90	99	e75	e72	e48	55	90	390	799	359	195	124
14	89	94	e70	e70	e50	57	104	384	850	345	191	127
15	90	88	e65	e65	e48	63	127	383	821	335	194	129
16	89	88	e60	e62	e55	59	125	424	806	325	190	125
17	88	85	e63	e59	66	61	112	470	828	316	186	122
18	86	84	e65	e57	64	61	125	591	882	308	181	121
19	85	83	e70	e55	59	62	152	725	870	301	177	121
20	86	83	e67	e58	e57	67	182	813	853	294	173	126
21	86	80	e70	e62	e60	74	230	835	882	288	170	121
22	84	85	e75	e65	e60	82	273	820	855	281	165	119
23	84	85	e69	73	60	80	297	802	813	275	169	117
24	84	83	e65	72	63	73	319	841	774	272	176	116
25	83	96	e72	70	e58	73	271	883	755	273	164	114
26	83	86	e65	e65	59	71	238	874	775	268	158	113
27	82	81	e55	e55	57	63	216	853	742	263	155	112
28	83	79	e65	e60	51	68	219	844	692	258	152	111
29	84	79	e75	e55	---	70	228	849	654	253	150	110
30	83	82	e75	e55	---	66	218	870	621	248	147	114
31	83	---	e60	e50	---	65	---	875	---	244	144	---
Total	2,722	2,602	2,189	2,011	1,542	1,946	4,344	17,404	24,516	11,152	5,884	3,747
Mean	87.8	86.7	70.6	64.9	55.1	62.8	145	561	817	360	190	125
Max	97	99	87	82	66	82	319	883	969	604	239	143
Min	82	79	55	50	48	53	62	217	621	244	144	110
Ac-ft	5,400	5,160	4,340	3,990	3,060	3,860	8,620	34,520	48,630	22,120	11,670	7,430

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1943-2009, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	89.4	77.5	68.5	63.1	60.2	62.2	159	529	611	287	150	107
Max	156	113	88.4	85.0	82.8	99.4	385	1,072	1,377	602	242	166
(WY)	(1987)	(1986)	(1983)	(1983)	(1984)	(1986)	(1946)	(1997)	(1986)	(1975)	(1983)	(1986)
Min	51.0	50.7	41.5	39.7	34.7	39.5	58.6	99.1	96.2	61.4	55.1	52.1
(WY)	(1978)	(1978)	(2002)	(2008)	(2003)	(1988)	(1975)	(1977)	(1977)	(1977)	(1977)	(1977)

Figure 2009.17 (cont.)

10039500 BEAR RIVER AT BORDER, WY

LOCATION.--Lat 42°12'40", long 111°03'11" referenced to North American Datum of 1927, in NE ¼ NE ¼ NE ¼ sec.15, T.14 S., R.46 E., Bear Lake County, ID, Hydrologic Unit 16010102, on left bank 0.2 mi west of Wyoming-Idaho State line, 0.5 mi west of Border, and 2.1 mi upstream from Thomas Fork.

DRAINAGE AREA.--2,480 mi².

PERIOD OF RECORD.--October 1937 to September 1996, October 1996 to September 2000 (seasonal), October 2000 to current year.

REVISED RECORDS.--WDR UT-74-1: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 6,051.63 ft above NGVD of 1929, unadjusted.

REMARKS.--Records good except for estimated daily discharges, which are poor. Natural flow of stream affected by regulation of upstream reservoirs, diversions for irrigation, and return flow from irrigated areas.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,880 ft³/s, Jun 7, 1983, gage height, 9.69 ft; minimum discharge, 24 ft³/s, Apr 29, 30, 1977.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,940 ft³/s, Jun 27, gage height, 6.81 ft.; minimum daily discharge, 105 ft³/s, Oct 2, 3.

DISCHARGE, CUBIC FEET PER SECOND WATER YEAR OCTOBER 2008 TO SEPTEMBER 2009 DAILY MEAN VALUES

[e, estimated]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	106	151	180	e139	e130	e150	241	622	1,210	1,420	283	165
2	105	151	177	e150	e130	e156	231	610	1,310	1,310	277	160
3	105	156	175	e140	e124	e170	229	640	1,360	1,220	272	152
4	108	165	175	e118	e124	e180	228	668	1,360	1,170	254	150
5	116	169	e166	e114	e124	e172	233	697	1,340	1,070	248	156
6	114	162	e180	e114	e134	e160	236	762	1,350	1,010	247	169
7	109	157	169	e134	e128	e160	237	819	1,400	962	249	169
8	108	156	169	e150	e136	e170	255	854	1,460	923	251	161
9	109	167	e168	e144	e148	e140	269	836	1,460	927	260	158
10	113	173	e168	e140	e148	e166	275	793	1,460	938	256	149
11	117	178	e162	e138	e144	e160	277	764	1,610	991	241	152
12	127	180	e166	e150	e140	e160	274	826	1,640	963	238	154
13	129	185	e162	e158	e144	e160	292	848	1,560	900	235	152
14	126	191	e156	e152	e160	e162	307	797	1,660	792	231	155
15	123	183	e156	e148	e150	e174	369	756	1,680	710	235	159
16	130	179	e150	e140	e140	e180	397	762	1,710	639	244	160
17	126	178	e138	e134	e140	e220	393	797	1,760	582	252	149
18	123	175	e134	e130	e150	e272	366	825	1,830	532	250	149
19	122	174	e134	e126	e140	e370	363	881	1,850	489	247	150
20	121	174	e136	e130	e136	e490	374	917	1,820	457	244	155
21	121	173	e148	e138	e132	e555	402	918	1,810	438	246	156
22	119	161	e158	e146	e138	e580	445	896	1,820	415	240	149
23	120	e158	e150	e148	e142	e530	480	896	1,760	381	230	144
24	120	e158	e142	e150	e158	e396	501	968	1,710	354	227	141
25	133	e152	e150	e144	e164	e360	537	1,060	1,660	340	224	138
26	149	e160	e142	e136	e162	e330	526	1,120	1,720	337	217	135
27	149	e166	e131	e130	e160	314	536	1,150	1,900	330	202	135
28	159	171	e140	e134	e154	284	583	1,230	1,860	315	187	130
29	156	179	e150	e144	---	272	647	1,340	1,700	309	187	127
30	151	179	e140	e138	---	267	656	1,280	1,560	298	176	126
31	149	---	e131	e132	---	251	---	1,200	---	292	165	---
Total	3,863	5,061	4,803	4,289	3,980	8,111	11,159	27,532	48,330	21,814	7,315	4,505
Mean	125	169	155	138	142	262	372	888	1,611	704	236	150
Max	159	191	180	158	164	580	656	1,340	1,900	1,420	283	169
Min	105	151	131	114	124	140	228	610	1,210	292	165	126
Ac-ft	7,660	10,040	9,530	8,510	7,890	16,090	22,130	54,610	95,860	43,270	14,510	8,940

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1938-96, 2001-09, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	200	217	190	175	198	365	708	978	1,125	515	218	172
Max	751	693	563	381	479	1,294	1,979	3,158	3,829	1,670	752	671
(WY)	(1983)	(1983)	(1983)	(1985)	(1986)	(1986)	(1985)	(1952)	(1983)	(1983)	(1983)	(1983)
Min	43.5	74.6	97.2	77.6	75.2	105	71.2	74.4	62.2	54.2	42.3	38.5
(WY)	(2002)	(2002)	(2002)	(1993)	(1993)	(1988)	(1977)	(1977)	(1977)	(1977)	(1940)	(1940)

Figure 2009.17 (cont.)

PacifiCorp Energy
Stream Discharge Records
Rainbow Inlet Canal 2008 - 2009
Daily Discharge (CFS)

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Day
1	66	127	126	114	100	163	351	683	872	1570	181	102	1
2	68	129	126	114	100	166	349	666	845	1390	173	97	2
3	70	131	126	113	99	168	351	651	941	1230	174	90	3
4	72	133	125	113	99	171	351	664	977	1170	174	90	4
5	75	134	125	112	101	174	360	684	998	1190	167	99	5
6	77	136	124	112	104	176	345	704	1030	1180	148	114	6
7	79	136	124	111	107	179	332	736	1070	1120	139	113	7
8	82	135	124	111	109	181	325	778	1160	994	134	106	8
9	84	135	123	111	112	184	324	785	1260	899	135	104	9
10	86	134	123	110	114	186	331	726	1310	831	147	95	10
11	89	134	122	110	117	189	339	695	1350	798	167	99	11
12	91	134	122	109	120	191	335	675	1490	814	180	101	12
13	93	133	122	109	122	194	337	677	1440	828	192	99	13
14	95	133	121	108	125	196	352	683	1410	810	190	97	14
15	98	133	121	108	127	199	378	665	1440	767	180	100	15
16	100	132	120	107	130	201	433	627	1440	708	179	104	16
17	102	132	120	107	132	204	482	611	1460	624	179	105	17
18	103	131	120	107	135	206	488	640	1500	542	179	94	18
19	105	131	119	106	138	256	482	657	1560	476	178	94	19
20	107	131	119	106	140	306	475	695	1610	420	175	95	20
21	109	130	119	105	143	366	479	700	1620	381	178	100	21
22	110	130	118	105	145	476	494	668	1580	335	172	101	22
23	112	129	118	104	148	515	521	620	1620	312	162	94	23
24	114	129	117	104	150	509	547	588	1590	290	160	89	24
25	115	129	117	103	153	471	577	633	1560	266	157	86	25
26	117	128	117	103	156	423	618	672	1540	246	151	83	26
27	119	128	116	102	158	392	617	714	1610	232	138	80	27
28	121	127	116	102	161	372	619	789	1790	219	121	80	28
29	122	127	115	102	162	364	652	925	1840	209	122	75	29
30	124	127	115	101	163	353	691	983	1670	192	113	72	30
31	126	115	115	101	166	348	700	931	1670	192	102	72	31

Monthly Totals													
Total	3,030	3,938	3,735	3,330	3,545	8,479	13,335	21,925	41,583	21,235	4,947	2,858	Yearly Totals
Daily Mean	97.70	131.00	120.00	107.00	127.00	274.00	445.00	707.00	1,390.00	685.00	160.00	95.30	361.00
Daily Min	65.50	127.00	115.00	101.00	98.90	163.00	324.00	588.00	845.00	192.00	102.00	72.00	65.50
Daily Max	126.00	136.00	126.00	114.00	161.00	515.00	691.00	983.00	1,840.00	1,570.00	192.00	114.00	1,840.00
Ins. Min	65.50	127.00	115.00	101.00	98.90	163.00	321.00	578.00	812.00	191.00	102.00	72.00	65.50
Ins. Max	126.00	136.00	126.00	114.00	161.00	521.00	701.00	989.00	1,870.00	1,630.00	196.00	114.00	1,874.92
Acre Ft	6,010	7,810	7,410	6,600	7,030	16,820	26,450	43,490	82,480	42,120	9,810	5,670	261,700

Notes: Measurements were taken at the cable way and below the Rainbow dam according to the inflows in the Rainbow Inlet canal. See Shift Summary description. Comparison between these flows and the Bear River at Border, Wyoming USGS gage confirmed the validity of these values. The gage is influenced by backwater flows, so during low flow periods, the daily operator estimates of flow are used.

Figure 2009.17 (cont.)

**PacifiCorp Energy
Reservoir Records**

**Bear Lake at Lifton (10055500) October 2008 - September 2009
Daily Contents (Thousands of Acre Feet)**

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Day
1	351	345	355	362	374	386	413	458	523	632	609	565	1
2	350	345	355	362	374	387	414	459	524	635	607	563	2
3	349	346	355	363	374	387	415	461	528	637	606	562	3
4	349	346	355	364	375	388	416	462	531	638	605	561	4
5	348	346	355	365	375	388	418	464	534	639	604	559	5
6	348	347	355	365	375	389	419	467	539	641	604	558	6
7	348	348	356	365	375	390	420	469	542	642	602	557	7
8	348	348	356	365	376	390	420	472	545	643	601	556	8
9	348	348	356	365	376	391	421	476	549	644	600	556	9
10	348	348	356	365	376	392	422	479	552	644	598	555	10
11	348	348	356	365	377	393	423	481	555	644	596	554	11
12	348	349	356	365	377	394	425	483	558	644	594	553	12
13	348	349	356	365	378	395	426	485	561	643	592	551	13
14	348	350	356	366	378	396	427	487	565	642	590	550	14
15	348	351	357	366	379	397	429	488	569	641	588	549	15
16	348	351	357	367	380	397	431	490	574	639	586	548	16
17	348	352	357	367	380	398	434	491	578	638	584	546	17
18	347	352	357	368	381	399	435	492	583	636	583	545	18
19	347	353	357	368	381	399	437	494	587	634	581	544	19
20	346	353	357	368	382	401	439	495	592	632	579	544	20
21	346	353	357	368	382	402	441	497	596	630	577	543	21
22	346	353	358	369	382	402	442	499	600	628	575	543	22
23	346	354	358	369	382	404	444	501	603	626	572	542	23
24	346	354	358	370	383	405	446	503	606	624	572	541	24
25	345	354	358	370	383	406	447	506	610	622	571	539	25
26	345	354	358	371	384	407	448	508	614	621	570	538	26
27	345	355	359	371	385	409	451	510	618	619	570	537	27
28	345	355	359	372	385	409	453	514	622	617	569	536	28
29	345	355	360	373	385	411	455	516	625	615	568	535	29
30	345	355	361	373	385	412	456	518	628	613	567	535	30
31	345	361	361	374	385	413	456	520	628	611	566	535	31

Monthly Statistics													Yearly Stats
Mean	347	351	357	367	379	398	432	489	574	633	587	549	455
Min	345	345	355	362	374	386	413	458	523	611	566	535	345
Max	351	355	361	374	385	413	456	520	628	644	609	565	644

Notes:

Figure 2009.17 (cont.)

**PacifiCorp Energy
Reservoir Level Records
Bear Lake at Lifton (10055500) October 2008 - September 2009
Daily Stage (Ft) Add 5900 for Elevation**

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Day
1	7.77	7.68	7.84	7.95	8.14	8.33	8.76	9.46	10.47	12.15	11.81	11.12	1
2	7.76	7.68	7.84	7.95	8.14	8.34	8.77	9.48	10.50	12.20	11.78	11.10	2
3	7.75	7.69	7.84	7.97	8.14	8.35	8.79	9.51	10.55	12.23	11.76	11.08	3
4	7.74	7.69	7.84	7.98	8.15	8.36	8.81	9.53	10.60	12.25	11.74	11.06	4
5	7.73	7.70	7.84	7.99	8.15	8.37	8.83	9.56	10.65	12.27	11.73	11.04	5
6	7.72	7.71	7.84	7.99	8.16	8.38	8.85	9.60	10.72	12.29	11.72	11.02	6
7	7.72	7.72	7.85	8.00	8.16	8.39	8.86	9.64	10.77	12.31	11.70	11.00	7
8	7.72	7.73	7.85	8.00	8.17	8.40	8.87	9.69	10.82	12.33	11.68	10.99	8
9	7.72	7.73	7.85	8.00	8.18	8.41	8.88	9.74	10.87	12.34	11.66	10.98	9
10	7.72	7.73	7.85	8.00	8.18	8.43	8.90	9.79	10.92	12.34	11.63	10.97	10
11	7.72	7.73	7.86	8.00	8.19	8.44	8.92	9.83	10.97	12.34	11.60	10.95	11
12	7.72	7.74	7.86	8.00	8.19	8.45	8.94	9.86	11.02	12.34	11.57	10.93	12
13	7.72	7.75	7.86	8.00	8.20	8.47	8.96	9.89	11.07	12.33	11.54	10.91	13
14	7.72	7.76	7.86	8.01	8.21	8.49	8.98	9.92	11.12	12.31	11.51	10.89	14
15	7.72	7.77	7.87	8.02	8.22	8.50	9.01	9.94	11.19	12.29	11.48	10.87	15
16	7.72	7.78	7.87	8.03	8.23	8.51	9.04	9.96	11.26	12.26	11.45	10.85	16
17	7.72	7.79	7.87	8.03	8.24	8.52	9.08	9.98	11.33	12.24	11.42	10.83	17
18	7.71	7.79	7.87	8.04	8.25	8.53	9.11	10.00	11.40	12.22	11.40	10.82	18
19	7.71	7.80	7.87	8.05	8.25	8.54	9.14	10.02	11.47	12.19	11.38	10.81	19
20	7.70	7.80	7.87	8.05	8.26	8.56	9.16	10.04	11.54	12.15	11.35	10.80	20
21	7.70	7.81	7.87	8.05	8.26	8.58	9.19	10.07	11.60	12.12	11.31	10.79	21
22	7.70	7.81	7.88	8.06	8.27	8.59	9.22	10.10	11.66	12.09	11.28	10.78	22
23	7.70	7.82	7.88	8.06	8.27	8.61	9.25	10.13	11.71	12.06	11.24	10.77	23
24	7.69	7.82	7.88	8.07	8.28	8.63	9.27	10.17	11.76	12.03	11.23	10.75	24
25	7.68	7.83	7.88	8.08	8.29	8.65	9.29	10.21	11.82	12.01	11.22	10.73	25
26	7.68	7.83	7.89	8.09	8.30	8.67	9.31	10.25	11.88	11.98	11.21	10.71	26
27	7.68	7.84	7.90	8.10	8.31	8.69	9.35	10.28	11.94	11.95	11.20	10.69	27
28	7.68	7.84	7.91	8.11	8.32	8.69	9.39	10.32	12.00	11.92	11.19	10.68	28
29	7.68	7.84	7.92	8.12	0.00	8.73	9.42	10.36	12.05	11.89	11.18	10.67	29
30	7.68	7.84	7.93	8.13		8.74	9.44	10.40	12.10	11.86	11.16	10.66	30
31	7.68		7.94	8.14		8.75		10.43		11.83	11.14		31

BEAR LAKE STATISTICS

	Monthly												Yearly
Daily Mean	7.71	7.77	7.87	8.03	7.93	8.52	9.06	9.94	11.26	12.17	11.46	10.88	9.38
Daily Min	7.68	7.68	7.84	7.95	0.00	8.33	8.76	9.46	10.47	11.83	11.14	10.66	0.00
Daily Max	7.77	7.84	7.94	8.14	8.32	8.75	9.44	10.43	12.10	12.34	11.81	11.12	12.34

Notes: Readings taken from staff gage at Utah State Parks Marina:

Figure 2009.17 (cont.)

PacifiCorp Energy
Stream Discharge Records
Bear Lake Outlet Canal 2008 - 2009
Daily Discharge (CFS)

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Day
1	5	5	5	5	5	5	5	5	5	5	438	428	1
2	5	5	5	5	5	5	5	5	5	417	367	406	2
3	5	5	5	5	5	5	5	5	5	508	294	372	3
4	5	5	5	5	5	5	5	5	5	518	291	328	4
5	5	5	5	5	5	5	5	5	5	521	373	327	5
6	5	5	5	5	5	5	5	5	5	525	485	327	6
7	5	5	5	5	5	5	5	5	5	526	487	329	7
8	5	5	5	5	5	5	5	5	5	597	485	328	8
9	5	5	5	5	5	5	5	5	5	694	484	327	9
10	5	5	5	5	5	5	5	5	5	730	483	328	10
11	5	5	5	5	5	5	5	5	5	736	481	268	11
12	5	5	5	5	5	5	5	5	5	843	480	206	12
13	5	5	5	5	5	5	5	5	5	977	484	204	13
14	5	5	5	5	5	5	5	5	5	982	559	205	14
15	5	5	5	5	5	5	5	5	5	980	636	169	15
16	5	5	5	5	5	5	5	5	5	976	624	75	16
17	5	5	5	5	5	5	5	5	5	973	552	75	17
18	5	5	5	5	5	5	5	5	5	967	554	75	18
19	5	5	5	5	5	5	5	5	5	1040	571	75	19
20	5	5	5	5	5	5	5	5	5	1130	590	75	20
21	5	5	5	5	5	5	5	5	5	1140	587	75	21
22	5	5	5	5	5	5	5	5	5	1140	588	75	22
23	5	5	5	5	5	5	5	5	5	1100	590	75	23
24	5	5	5	5	5	5	5	5	5	1010	599	75	24
25	5	5	5	5	5	5	5	5	5	958	595	75	25
26	5	5	5	5	5	5	5	5	5	956	541	75	26
27	5	5	5	5	5	5	5	5	5	879	481	75	27
28	5	5	5	5	5	5	5	5	5	774	447	75	28
29	5	5	5	5	5	5	5	5	5	777	447	75	29
30	5	5	5	5	5	5	5	5	5	647	446	75	30
31	5	5	5	5	5	5	5	5	5	446	446	75	31

Monthly Statistics

Vol. (SFD)	155	150	155	155	140	155	150	155	150	24,472	15,485	5,677	Yearly Stats 46,999
Daily Mean	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	789.00	500.00	189.00	127.00
Daily Min	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	291.00	75.00	5.00
Daily Max	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	1,140.00	636.00	428.00	1,140.00
Ins. Min	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	288.00	75.00	5.00
Ins. Max	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	1,140.00	658.00	447.00	1,140.00
Vol. (AF)	307	298	307	307	278	307	298	307	298	48,540	30,710	11,260	93,217

Notes: Water was turned back into the Outlet canal on July 2nd to begin the 2009 irrigation season. Reviewed 8/10/2010 by Connelly Baldwin.

Figure 2009.17 (cont.)

10092700 BEAR RIVER AT IDAHO-UTAH STATE LINE

LOCATION.--Lat 42°00'47", long 111°55'14" referenced to North American Datum of 1927, in NE ¼ NW ¼ NE ¼ sec.29, T.16 S., R.39 E., Franklin County, ID, Hydrologic Unit 16010202, on left bank 1,050 ft downstream from inlet canal to Cub River pumps, 1.1 mi downstream from Weston Creek, 1.8 mi upstream from Idaho-Utah State line, and 3.5 mi southeast of Weston.

PERIOD OF RECORD.--October 1970 to current year.

REVISED RECORDS.--WDR UT-74-1: Drainage area.

GAGE.--Water-stage recorder and crest-stage gage. Elevation of gage is 4,420 ft above NGVD of 1929, from topographic map. Prior to September 10, 1982 at datum 2.00 ft higher. September 10, 1982 to September 30, 1985 at datum 10.0 ft lower.

REMARKS.--Records fair except for estimated daily discharges, which are poor. Natural flow of stream affected by storage reservoirs, power developments, diversions for irrigation, and return flow from irrigated areas.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,870 ft³/s, Jun 14, 1984, gage height, 9.20 ft; minimum daily discharge, 24 ft³/s, May 16, 2004.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 2,160 ft³/s, Jun 16, gage height, 13.76 ft; minimum daily discharge, 157 ft³/s, Sep 20.

**DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2008 TO SEPTEMBER 2009
DAILY MEAN VALUES
[e, estimated]**

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	304	331	390	431	429	477	685	1,140	965	577	e611	386
2	289	379	390	457	428	463	689	1,300	1,040	443	e527	392
3	280	496	401	445	410	485	741	1,260	991	393	e462	385
4	280	399	404	e380	410	603	680	1,150	1,060	384	e427	347
5	373	402	360	e370	431	708	587	719	1,050	411	e378	e302
6	355	387	367	e370	451	750	587	782	1,120	558	e490	306
7	288	305	412	e430	474	709	620	702	1,180	523	e490	295
8	268	294	376	455	500	641	642	759	1,340	593	598	230
9	268	296	373	516	427	642	681	757	1,550	594	678	221
10	324	335	373	489	440	591	648	837	1,650	677	717	270
11	375	315	374	427	438	400	709	779	1,910	698	710	290
12	410	311	397	e430	430	411	975	793	2,010	695	698	335
13	470	421	407	e400	423	417	872	810	1,850	691	e597	306
14	437	409	397	e390	420	438	895	816	1,910	645	e579	311
15	526	435	391	e390	413	425	1,040	826	1,930	648	e560	302
16	448	403	373	e385	416	440	1,220	838	1,980	654	e551	302
17	361	418	385	e380	449	488	1,040	854	1,840	674	e541	298
18	288	440	e360	e370	466	655	968	830	1,820	717	565	292
19	323	423	e360	e380	445	874	943	807	1,810	e790	584	e205
20	357	387	e380	e400	457	470	948	793	1,770	808	580	157
21	384	415	e395	e410	439	946	1,010	796	1,780	e790	509	185
22	375	417	412	417	443	731	1,080	840	1,740	e786	397	282
23	486	416	428	473	411	825	1,040	833	1,680	e826	407	278
24	447	414	400	484	485	881	1,090	875	1,520	e864	468	245
25	347	415	409	495	664	1,100	1,190	957	1,330	e870	477	279
26	407	415	e385	478	638	989	1,210	1,070	1,430	e821	511	289
27	472	400	e390	e430	491	759	1,400	1,010	1,220	e758	553	290
28	280	396	e380	e400	496	1,140	1,310	919	1,020	e749	517	293
29	271	387	e400	e425	---	934	1,350	814	1,050	e684	499	285
30	268	384	409	460	---	887	1,320	810	768	e592	415	313
31	272	---	429	461	---	680	---	900	---	e565	391	---
Total	11,033	11,645	12,107	13,228	12,824	20,959	28,170	27,376	44,314	20,478	16,487	8,671
Mean	356	388	391	427	458	676	939	883	1,477	661	532	289
Max	526	496	429	516	664	1,140	1,400	1,300	2,010	870	717	392
Min	268	294	360	370	410	400	587	702	768	384	378	157
Ac-ft	21,880	23,100	24,010	26,240	25,440	41,570	55,880	54,300	87,900	40,620	32,700	17,200

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1971-2009, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	846	901	914	899	907	1,112	1,332	1,406	1,282	969	886	840
Max	2,850	2,983	2,552	1,904	2,556	3,264	3,594	3,968	4,263	3,442	2,416	2,545
(WY)	(1984)	(1984)	(1985)	(1984)	(1986)	(1986)	(1986)	(1986)	(1986)	(1983)	(1984)	(1986)
Min	223	298	310	269	296	351	351	158	301	368	461	192
(WY)	(2004)	(1993)	(1982)	(2004)	(2002)	(1991)	(2003)	(2003)	(2004)	(2006)	(1993)	(1992)

Figure 2009.17 (cont.)

**10109001 COMBINED DISCHARGE, IN CUBIC FEET PER SECOND, OF LOGAN RIVER ABOVE
STATE DAM AND LOGAN, HYDE PARK AND SMITHFIELD CANAL NEAR LOGAN, UT**

REVISED RECORDS.--WDR UT-04-1: Discharge

**DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2008 TO SEPTEMBER 2009
DAILY MEAN VALUES**

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	134	112	107	98	97	98	124	332	906	510	267	197
2	135	118	105	102	94	97	117	349	941	497	263	194
3	133	119	106	98	95	100	119	387	965	482	260	191
4	135	124	106	78	95	106	118	420	950	467	256	190
5	137	117	101	84	97	106	116	421	920	453	251	190
6	134	113	104	98	99	101	119	515	901	438	250	190
7	131	112	104	102	98	99	124	544	904	424	250	187
8	130	111	104	101	98	99	140	558	872	406	248	185
9	130	112	99	99	100	103	152	536	831	400	241	184
10	130	125	100	95	98	97	151	510	815	387	241	181
11	132	127	100	96	97	95	157	524	816	376	239	179
12	131	128	102	104	95	96	166	544	804	369	234	176
13	126	129	107	107	94	95	191	509	797	364	233	175
14	122	127	100	107	99	96	232	506	797	360	233	178
15	121	124	98	106	94	96	245	556	771	349	235	176
16	120	123	99	104	94	99	219	603	737	340	232	172
17	119	122	96	105	99	108	199	626	726	346	229	169
18	118	120	91	103	95	114	218	698	726	339	225	169
19	117	120	98	103	93	118	268	803	704	333	221	168
20	117	120	97	104	93	127	320	915	690	353	218	170
21	117	120	96	103	92	147	368	971	694	318	215	167
22	116	119	100	106	93	166	440	945	664	309	213	166
23	116	119	97	114	94	152	488	915	634	304	217	165
24	116	117	94	117	101	137	485	932	609	300	225	164
25	115	116	99	119	103	132	458	1,010	598	298	213	164
26	114	117	97	112	101	125	398	979	592	292	207	162
27	114	117	92	96	99	119	340	927	577	285	206	161
28	114	112	95	102	95	119	325	919	551	284	201	159
29	114	109	98	100	---	126	330	934	526	281	201	158
30	113	109	97	97	---	122	334	954	514	275	201	159
31	112	---	94	95	---	120	---	931	---	270	198	---
Total	3,813	3,558	3,083	3,155	2,702	3,515	7,461	21,273	22,532	11,209	7,123	5,246
Mean	123	119	99.5	102	96.5	113	249	686	751	362	230	175
Max	137	129	107	119	103	166	488	1,010	965	510	267	197
Min	112	109	91	78	92	95	116	332	514	270	198	158
Ac-ft	7,560	7,060	6,120	6,260	5,360	6,970	14,800	42,200	44,690	22,230	14,130	10,410

Figure 2009.17 (cont.)

10126000 BEAR RIVER NEAR CORINNE, UT

LOCATION.--Lat 41°34'35", long 112°06'00" referenced to North American Datum of 1927, in NE ¼ SE ¼ NE ¼ sec.30, T.10 N., R.2 W., Box Elder County, UT, Hydrologic Unit 16010204, on right bank 1.2 mi downstream from Salt Creek, 2.0 mi northeast of Corinne, and 2.8 mi downstream from Malad River.

DRAINAGE AREA.--7,029 mi².

PERIOD OF RECORD.--October 1949 to September 1957, October 1963 to current year.

REVISED RECORDS.--WRD UT-74-1: Drainage area.

GAGE.--Water-stage recorder and crest-stage gage. Datum of gage is 4,204.6 ft above NGVD of 1929, unadjusted. Auxiliary nonrecording gage 7,800 ft downstream July 27, 1950 to November 21, 1955.

REMARKS.--Records good except for estimated daily discharges, which are poor. Natural flow of stream affected by Cutler Dam many miles upstream of gage, power development, diversions for irrigation, and return flow from irrigated areas and backwater from Bear River Bird Refuge about 5 miles downstream.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 14,770 ft³/s, May 19, 1984, gage height, 17.50 ft; minimum daily discharge, 23 ft³/s, Jul 30, 2004.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 3,970 ft³/s, Jun 17, gage height, 11.06 ft; minimum daily discharge, 87 ft³/s, Aug 5.

DISCHARGE, CUBIC FEET PER SECOND WATER YEAR OCTOBER 2008 TO SEPTEMBER 2009 DAILY MEAN VALUES

[e, estimated]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	341	830	834	e1,050	e1,020	1,130	2,030	3,160	2,190	1,560	111	171
2	327	740	826	e1,080	e955	1,520	1,780	3,100	2,280	729	111	168
3	418	696	1,070	e1,000	e908	1,050	1,970	3,070	2,320	901	114	156
4	456	1,270	1,170	e1,040	e1,070	1,450	1,520	3,070	2,530	803	96	153
5	758	1,640	1,130	e996	e927	1,920	1,960	3,090	2,610	336	87	154
6	724	1,690	742	e942	e832	2,440	1,740	3,290	2,720	172	101	165
7	686	1,540	775	e831	e708	2,290	1,640	3,290	2,720	231	113	179
8	750	1,130	679	e788	e701	2,210	1,640	3,030	2,770	224	126	174
9	851	952	1,060	e1,150	e1,010	2,030	1,650	2,930	2,880	150	149	160
10	875	891	1,030	e1,070	e820	2,100	1,790	2,970	3,070	139	166	158
11	942	890	e533	e912	e1,020	1,850	1,960	2,980	3,530	134	160	164
12	962	919	e1,010	e960	e932	1,800	1,720	2,630	3,820	131	153	167
13	557	973	e1,080	e1,140	e740	1,210	1,880	2,420	3,910	126	150	171
14	756	962	e1,060	e916	e685	963	2,090	2,440	3,930	118	158	191
15	981	767	e555	e806	e800	1,030	2,370	2,070	3,920	115	200	210
16	1,030	287	e986	e1,220	e1,100	1,140	2,970	1,700	3,890	116	168	201
17	1,040	135	e1,160	e1,080	e750	1,330	3,470	1,850	3,930	120	151	180
18	894	105	e985	e936	e800	1,960	3,780	1,880	3,950	120	153	176
19	1,040	360	e791	e908	e510	2,260	3,770	1,910	3,910	120	144	308
20	557	477	e916	e882	e660	2,580	3,380	1,870	3,740	123	134	374
21	730	972	e1,020	e793	e960	2,330	2,890	2,210	3,570	118	124	245
22	747	1,090	e913	e561	e940	2,020	2,950	2,330	3,280	121	127	215
23	688	1,060	e792	e798	e940	2,130	2,860	2,370	3,150	122	143	281
24	751	820	e824	e919	e990	2,580	3,420	2,420	3,090	108	165	380
25	1,010	899	e852	e990	e950	2,670	3,570	2,530	2,900	116	166	453
26	785	1,010	e809	e1,660	1,180	2,660	3,710	2,580	2,390	116	165	675
27	541	1,070	e777	e1,800	1,810	2,510	3,710	2,580	2,020	118	155	493
28	1,120	857	e848	e1,460	1,680	2,140	3,590	2,710	2,080	108	151	289
29	1,170	958	e801	e1,240	---	2,120	3,420	2,620	2,020	116	152	464
30	1,190	966	e710	e1,050	---	2,020	3,310	2,450	1,790	117	168	527
31	900	---	e984	e1,160	---	1,990	---	2,270	---	115	174	---
Total	24,577	26,956	27,722	32,138	26,398	59,433	78,540	79,820	90,910	7,743	4,435	7,802
Mean	793	899	894	1,037	943	1,917	2,618	2,575	3,030	250	143	260
Max	1,190	1,690	1,170	1,800	1,810	2,670	3,780	3,290	3,950	1,560	200	675
Min	327	105	533	561	510	963	1,520	1,700	1,790	108	87	153
Ac-ft	48,750	53,470	54,990	63,750	52,360	117,900	155,800	158,300	180,300	15,360	8,800	15,480

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1950-57, 1964-2009, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	1,285	1,546	1,621	1,746	1,783	2,277	2,791	2,845	2,131	662	573	855
Max	4,240	4,471	4,414	3,639	5,966	6,041	7,258	9,598	9,201	4,186	3,045	3,423
(WY)	(1984)	(1985)	(1984)	(1984)	(1986)	(1986)	(1985)	(1984)	(1984)	(1983)	(1983)	(1984)
Min	95.6	621	535	620	723	913	638	71.8	77.6	40.4	46.7	62.2
(WY)	(1993)	(2001)	(1995)	(1993)	(1993)	(1991)	(1992)	(1992)	(1992)	(2003)	(2004)	(1992)

Figure 2009.17 (cont.)

2010 WATER SUPPLY AND DISTRIBUTION REPORT

2010 Water Supply and Distribution Report

OVERVIEW

The 2010 water year was below average, but because the prior year was well above average, with storage, water supplies in all divisions fared okay. No calls for a water emergency were received in any of the three divisions and hence, no water emergencies were declared. The 2010 year ended with relatively similar amounts of water in storage as was in storage at the beginning of the year.

WATER SUPPLY

Three stream gages, one in each division of the river, have been used by the Commission as indicator gages of the relative supply available for each of the divisions of the river (see Stream Gaging Program section in the Overview chapter). The Utah-Wyoming State Line and Smith's Fork gages measure a major portion of the streamflow in the Upper and Central Divisions, respectively. The Logan River is a major tributary to the Bear River in Cache Valley, which is in the Lower Division. Specific discharges, as measured by the USGS for the three gages during 2010, compared with the long-term averages, are summarized in Figure 2010.1 and are graphically illustrated in Figures 2010.2 through 2010.4 on the subsequent pages.

Figure 2010.1 illustrates a summary of the volumetric discharge for each of these gages for the water year. As the water supply available during the irrigation season is most critical for filling the natural flow rights, the discharge as measured at these gages during the irrigation season is also illustrated in Figure 2010.1.

Figures 2010.2 through 2010.4 show hydrographs for each of these three gaging stations. On each hydrograph, the mean daily flow during the irrigation season is plotted against the average of the mean daily flows for the period 1943 through 2010. The area between the 2010 hydrographs and the mean hydrographs represents the difference in volume of water discharged during 2010 versus the long-term average. This volumetric difference is illustrated by the bar charts shown on each of the figures.

2010 Water Supply Summary by Division

2010 WATER YEAR

(Discharge in Acre-feet)

GAGE	AVERAGE (1943-10)	2010	PERCENT
Upper Division (UT-WY State Line)	138,700	127,300	92%
Central Division (Smith's Fork)	136,500	109,400	80%
Lower Division (Logan River)	181,500	143,700	79%

2010 IRRIGATION SEASON

MAY - SEPTEMBER

(Discharge in Acre-feet)

GAGE	AVERAGE (1943-10)	2010	PERCENT
Upper Division (UT-WY State Line)	114,600	108,300	94%
Central Division (Smith's Fork)	101,700	76,400	75%
Lower Division (Logan River)	121,500	93,300	77%

Figure 2010.1

As can be seen in Figure 2010.1, the annual discharge for the Upper Division (Utah-Wyoming State Line gage) was 92 percent of the long-term average, and streamflow on Smith's Fork and the Logan River were 80 and 79 percent, respectively. More important to the natural flow diversions than the streamflow during the water year is the streamflow during the irrigation season of May through September. During this period, the water supply was approximately 94 percent (Upper Division), 75 percent (Central Division), and 77 percent (Lower Division). These indicator gages show that the water supply started below normal and got worse as the year wore on.

A closer look at the three hydrographs (Figures 2010.2, 2010.3 and 2010.4) is also insightful when one is trying to understand the natural water supply in the spring and summer of 2010. The Upper Division gage (Figure 2010.2) indicates runoff began well below normal and then dramatically spiked up for about one week in early June followed by a second, smaller peak in late June after which flows dramatically dropped to near normal levels for the remainder of the irrigation season. The Central Division gage (Figure 2010.3) indicates runoff was also below normal in May and only climbed up to near normal in early June, after which it tapered off to normal through August and September. The Lower Division indicator gage (Figure 2010.4) shows a very similar pattern as the Central Division, with runoff much below normal during May and rising to near normal in June and then remaining below normal through the remainder of the irrigation season.

2010 - Upper Division Water Supply

Flow at Utah-Wyoming State Line Gage

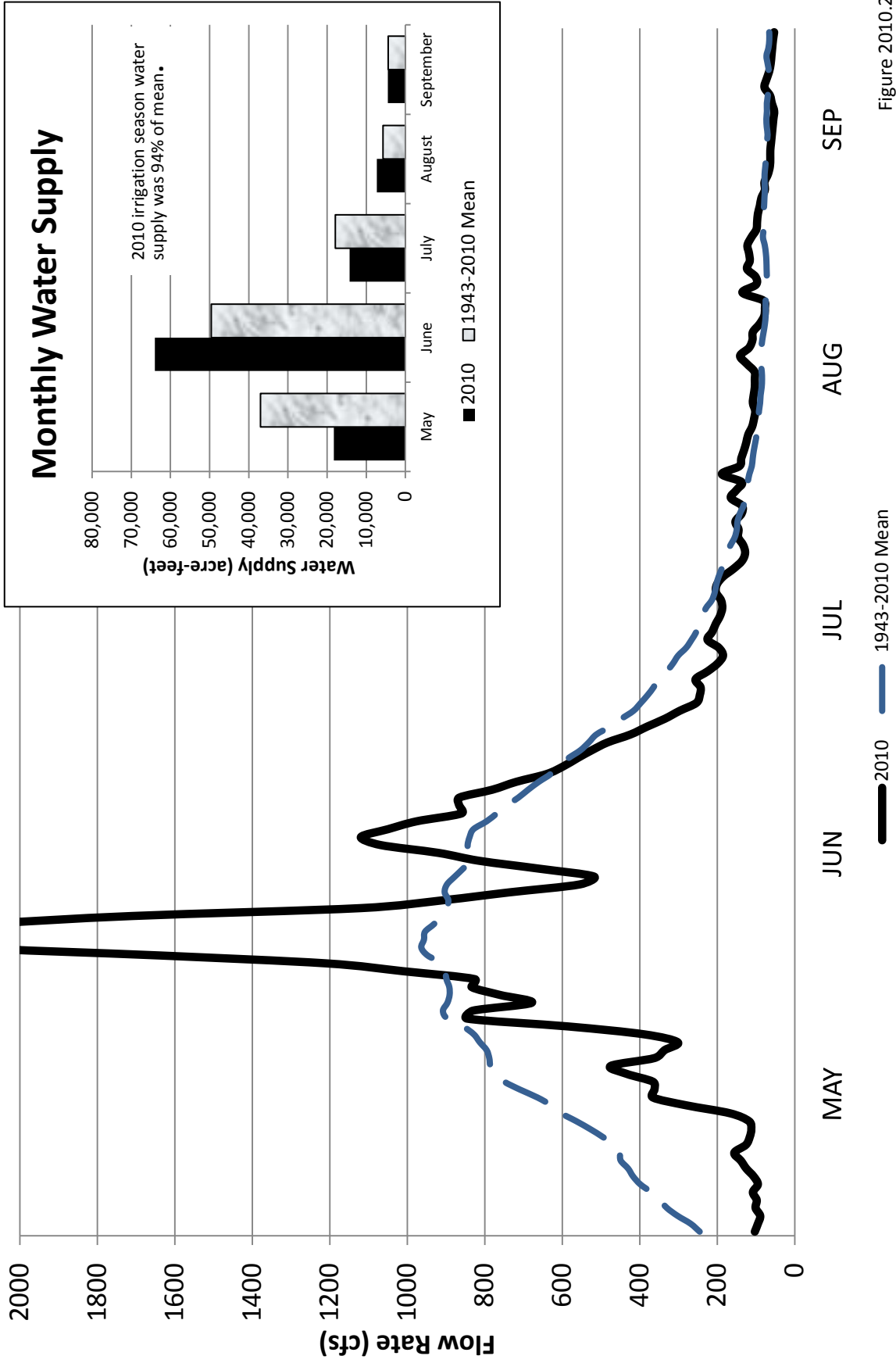


Figure 2010.2

2010 - Central Division Water Supply

Flow at Smiths Fork near Border, Wyoming Gage

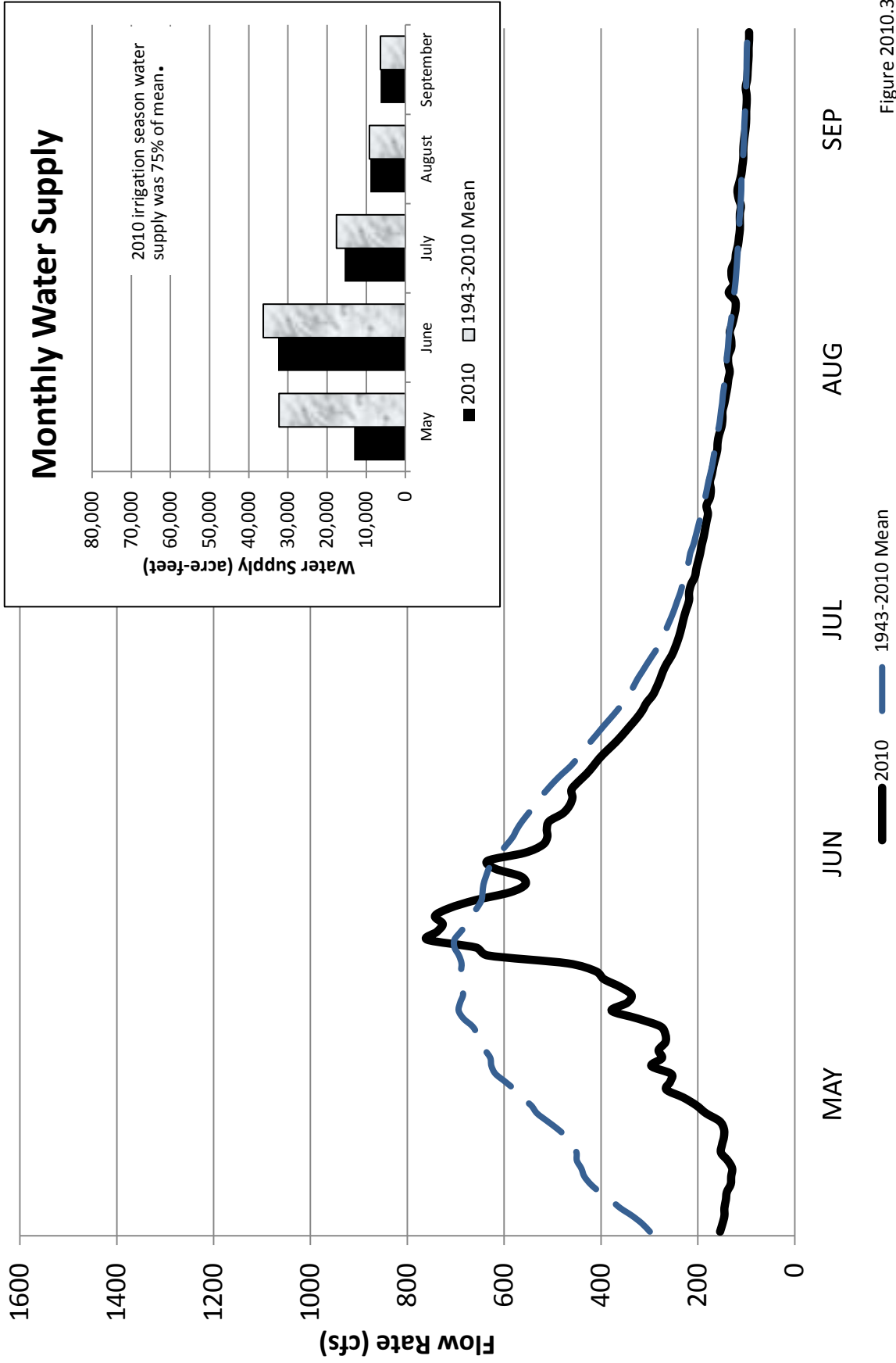


Figure 2010.3

2010 - Lower Division Water Supply

Flow at Logan River Combined Gage

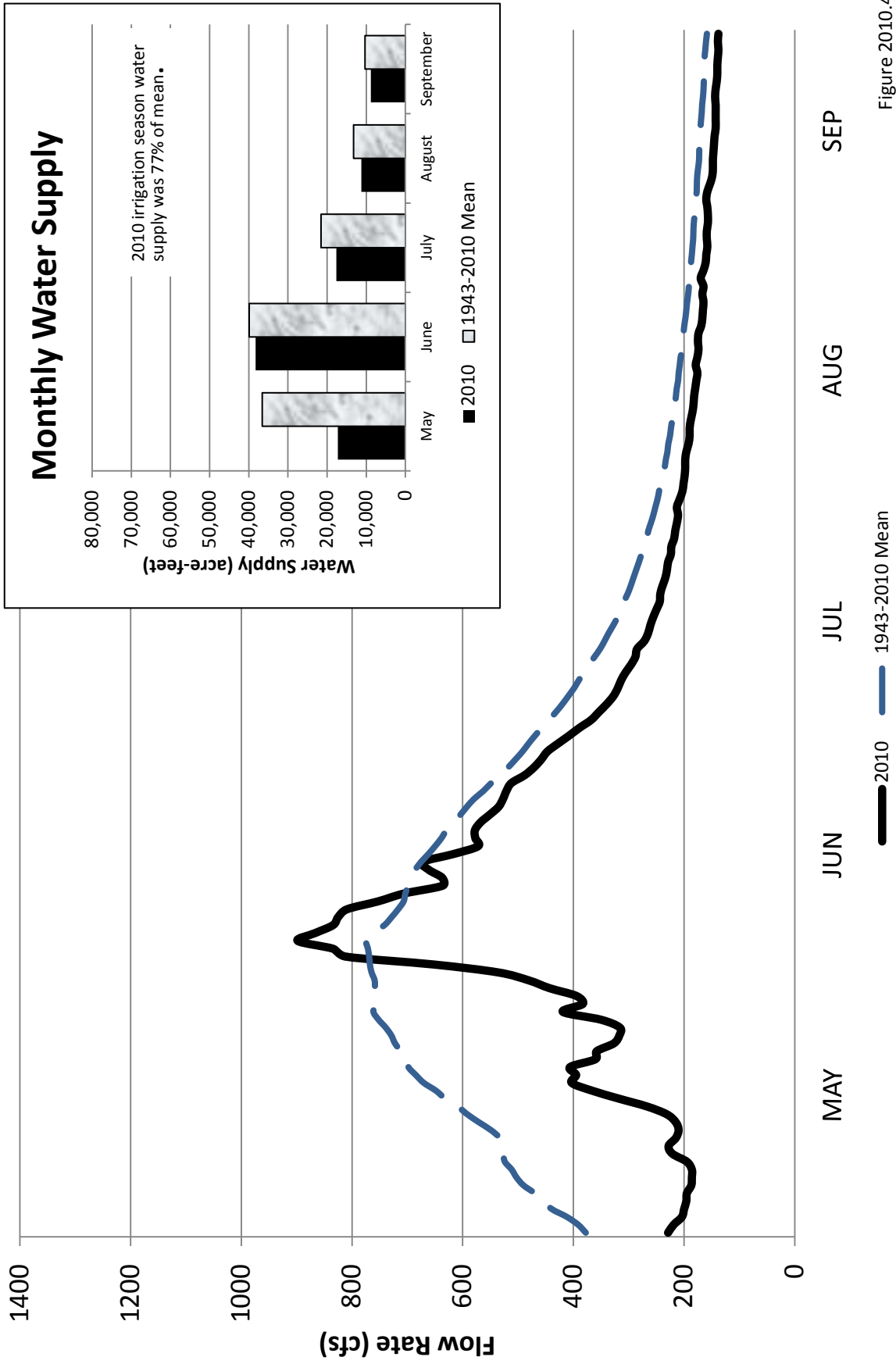


Figure 2010.4

STORAGE

Storage supplies along the Bear River have a notable impact on the water resources available for irrigation each year. Because the prior water year was a wet water year, storage in the 2010 water year started with more carryover storage than had been the case in the preceding years. Woodruff Narrows Reservoir is the largest reservoir in the Upper Division. However, Whitney, Sulphur Creek, and Woodruff Creek Reservoirs also provide for notable amounts of winter storage.

Paragraph B of Article VI of the Amended Compact, which allows for additional storage rights above Stewart Dam, also has a provision which restricts storage to occur if the water surface elevation at Bear Lake is below an elevation of 5911.0 (UP&L Datum). About half of the storage which is assigned to Woodruff Narrows Reservoir, from both the States of Utah and Wyoming, fall under this provision of the Amended Compact. Bear Lake was below this storage restriction elevation at the start of the storage season; thus, this provision of the Compact was activated and upstream storage restrictions were imposed. However, with above average carryover from the prior wet year, Woodruff Narrows, Sulphur Creek and Whitney Reservoirs were allowed to fill. Furthermore, Bear Lake rose above the 5911 storage restriction elevation midway through the storage season.

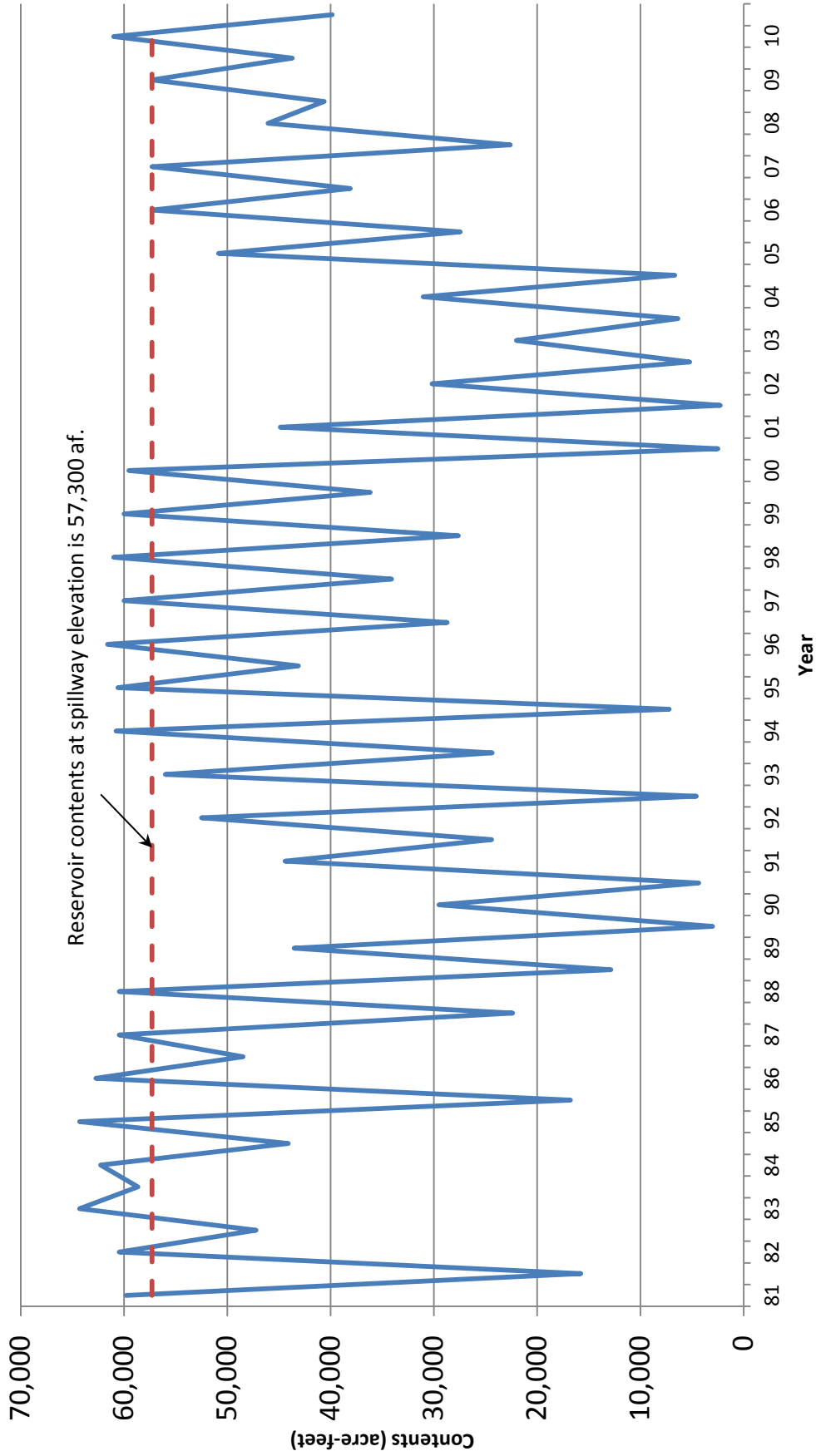
Prior to 1997, a gage was maintained, with Commission funding, by the USGS on Woodruff Narrows Reservoir. The gage included a recorder which allowed for preservation of daily values. Since this time, periodic measurements have been kept by the Woodruff Narrows Reservoir Company in coordination with the Wyoming State Engineer's Office. Figure 2010.5 shows the maximum and minimum contents for the Woodruff Narrows Reservoir since its enlargement in 1980. Values for 2010 are based on observations made by the Woodruff Narrows Reservoir Company.

The spillway crest of Woodruff Narrows Dam is at an elevation of 6454.5 feet; contents of 57,300 acre-feet. Hence, contents above this amount represent uncontrolled storage as this storage is only temporary and cannot be controlled by the reservoir company. Generally, during spill periods, the reservoir company is often releasing significant flows through its outlet works as well. Hence, though the total contents are uncontrolled, the proportion of water discharging from the reservoir through the outlet works versus over the spillway is somewhat under the control of the reservoir company. Both discharge to the Bear River below the dam but above the stream gage and it makes no difference to the total discharge into the Bear River.

There is no significant storage in the Central Division.

The largest and most significant storage reservoir in the Lower Division, and in the entire watershed, is Bear Lake, which is at the very top of the Lower Division. Bear Lake is operated as a storage reservoir by PacifiCorp. The Compact regulates various aspects of how PacifiCorp can manage the storage of water within Bear Lake. Figure 2010.6 summarizes the 2010 Bear Lake hydrologic information and significant operational events.

Woodruff Narrows Reservoir Annual Maximum and Minimum Contents



Note: Through the 1996 water year a gage with a recorder was maintained by the USGS on Woodruff Narrows Reservoir. Since this time, values are based on spot observations and estimates by the Woodruff Narrows Reservoir Company and the Wyoming State Engineer's Office. Contents above 57,300 af represent uncontrolled storage.

Figure 2010.5

**Summary of Significant
2010 Bear Lake
Hydrologic Information and Operational Events**

<u>Date</u>	<u>Hydrologic Information/Event</u>	<u>Contents (% of Full) Discharge (% of Normal)</u>
10-01-09	Bear Lake Beginning Elevation — 5910.65	534,157 af (38%)
11-14-09	Bear Lake Low Elevation ¹ — 5910.44	520,615 af (37%)
	Rainbow Inlet Canal Discharge	184,440 af (79%)
	Bear River Discharge Below Stewart Dam	2,380 af
	Bear Lake Net Runoff (Computed Total Inflow less Lake Evaporation)	211,000 af (65%)
06-29-10	Bear Lake High Elevation — 5913.16	698,131 af (49%)
	Outlet Canal Releases: 6/24-10/2 (101 days)	182,000 af (62%)
07-22-10	Outlet Canal Maximum Release – 1,540 cfs	
	Bear Lake Storage Release ²	117,000 af
09-30-10	Bear Lake Ending Elevation — 5910.27	509,669 af (36%)
	Bear Lake Settlement Agreement “System Loss” Volume ³	12,100 af

¹ Low contents prior to start of storage.

² Net irrigation storage release from Bear Lake, subtracting Rainbow inflow and the decreed adjustment for the natural yield of Bear Lake and Mud Lake area. Whenever water flows below Cutler during the irrigation season, any storage water in the system at Cutler is the first water out.

³Natural flow goes to irrigators.

Figure 2010.6

Figure 2010.6 provides much information as to the water stored in Bear Lake in 2010. Some of this information will be discussed in the “Lower Division” section of this report. It is interesting to note from Figure 2010.6 that the lake ended the 2010 water year with nearly the same storage as at the beginning of the year. It can be noted that 117,000 acre-feet was released to downstream irrigators and that the lake level rose above and then fell below the Compact storage restriction level of 5911 feet for the entire year.

Figure 2010.7 is a graph which shows the annual maximum and minimum elevations of Bear Lake since 1915. With a beginning elevation well below the operating target, Bear Lake was operated in storage mode during the entire storage period. Figure 2010.8 is an area plot showing the daily contents in Bear Lake over the past ten years. This hydrograph and Figure 2010.7 show the significant drop in Bear Lake water levels in the early 2000s, followed by a relatively stable, but low water level the past few years.

Bear Lake has such a large storage capacity compared to average annual use that it greatly buffers the potential shortages in the Lower Division over a period of below-normal years, but for the same reason, recovery from a depleted reservoir can be slow.

BEAR LAKE ELEVATION

Annual Maximum & Minimum Elevations

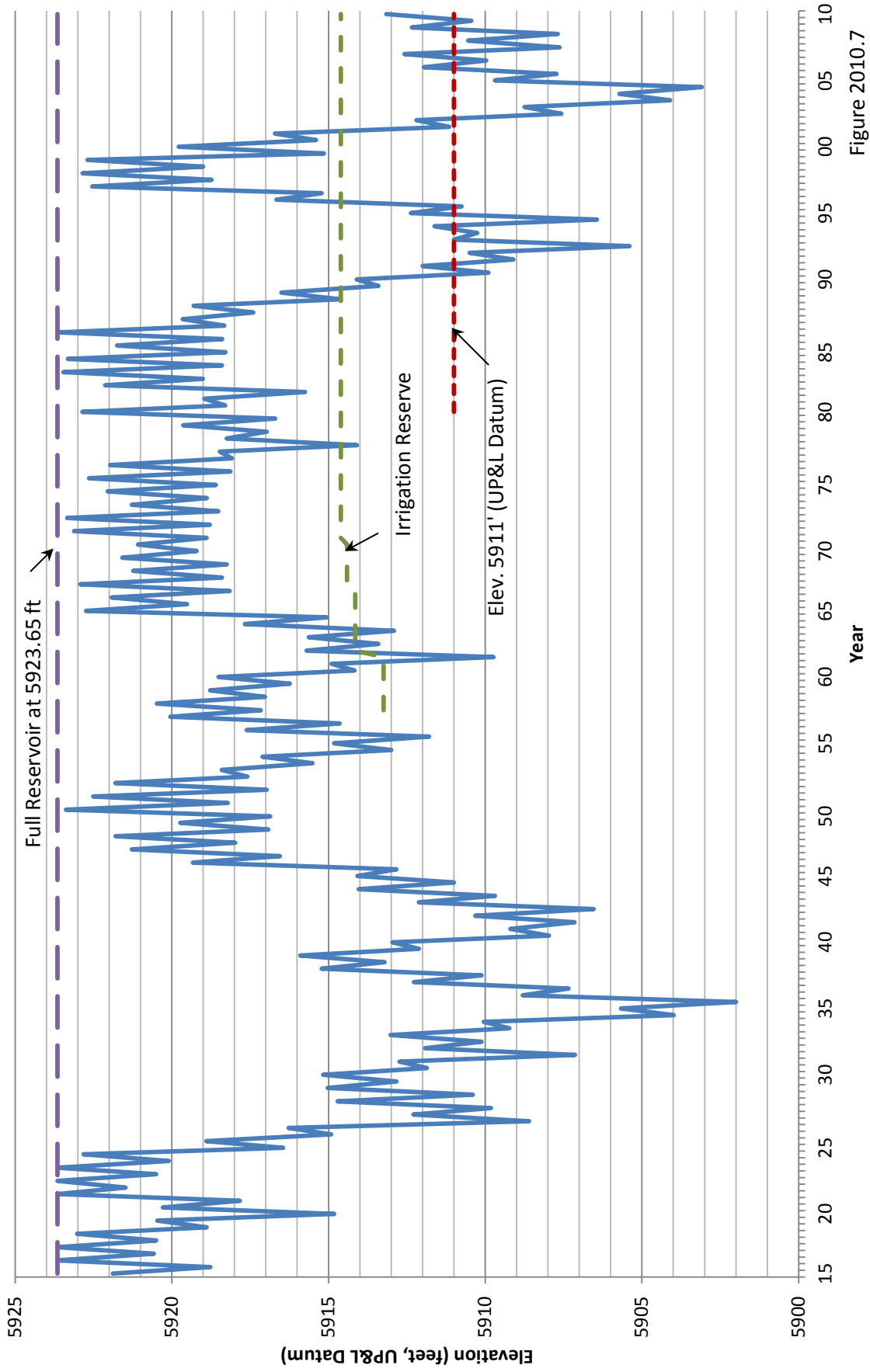


Figure 2010.7

BEAR LAKE CONTENTS

Water Years 2001 - 2010

Bear Lake's maximum active storage contents is 1,421,000 at an elevation of 5923.65'.

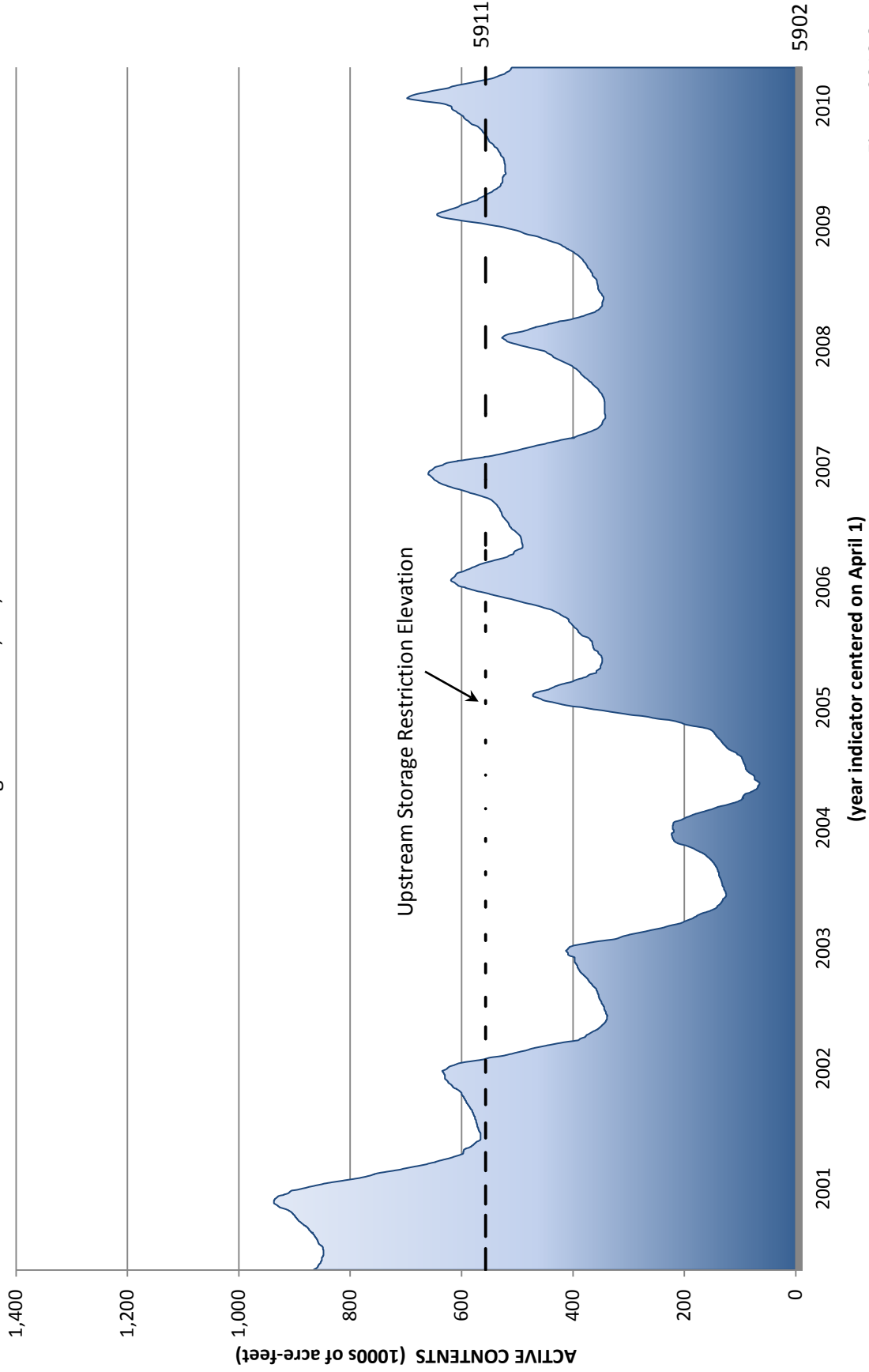


Figure 2010.8

STREAMFLOW DISTRIBUTION

General

The water administration in 2010 in the three divisions remained similar to prior years. There were no changes to the River Commissioners/Watermasters in each of the sections from the previous year. Don A. Barnett began to serve as Engineer-Manager of the Bear River Commission. Each River Commissioner/Watermaster works under the direction of the respective State Engineers' offices, but coordinates with the Commission's Engineer-Manager with regard to total diversions in each of the various sections as defined by the Compact.

During the 2010 irrigation season, the following River Commissioners/Watermasters measured water in their sections of the river:

<u>DIVISION</u>	<u>SECTION</u>	<u>RIVER COMMISSIONER/ WATERMASTER</u>
<u>Upper:</u>	Upper Utah	Don Shoemaker
	Upper Wyoming	Don Shoemaker
	Lower Utah	Ron Hoffman
	Lower Wyoming	Mike Johnson
<u>Central:</u>	Wyoming	Mike Johnson
	Idaho	Rock Holbrook
<u>Lower:</u>	Idaho	Rock Holbrook
	Utah	Jim Watterson

Snow survey information early in 2008 was encouraging, and there was a hope that 2008 would be better than the prior water year. This turned out to be the case. The 2008 water year was near normal, especially during the irrigation season and sufficient water supplies were available in all divisions. No water emergencies were requested or declared. [Look up]

Upper Division

The Upper Division divertible flow, as defined by the Compact, consists of a summation of the diversions of all of the canals in the four sections, plus waters bypassing Pixley Dam, less that portion of water diverted by the canals which is attributable to storage releases from Whitney, Sulphur Creek and Woodruff Narrows Reservoirs. The Compact provides that when the total divertible flow is less than 1250 cfs, a water emergency exists. The text of the 2009 chapter of this report describes how divertible flows are calculated and how water is allocated in the Upper Division. The 2010 water supply in the Upper Division

was below normal and no new issues were raised. Hence, for general information, the reader is referred to that chapter.

Figures 2010.9 and 2010.10 show the divertible flow and natural flow diversions in the Upper Wyoming and Lower Utah Sections, respectively. Also shown on the graphs (magenta line) is what would have been the Compact allocation had a water emergency been imposed. However, in 2010, though streamflow was below normal, with coordination and communication between the River Commissioners and Watermasters, the available flows were distributed without the official declaration of a water emergency. As can be seen in Figure 2010.9, the river naturally limited the Upper Wyoming Section to what would have been its allocation had a water emergency been declared. Figure 2010.11 is a tabulation by month of canal diversions and shows the calculation of divertible flow and allocations to the respective sections, pursuant to the Compact, had a water emergency been declared.

**2010 - UPPER DIVISION
Upper Wyoming Section Diversion vs Allocation**

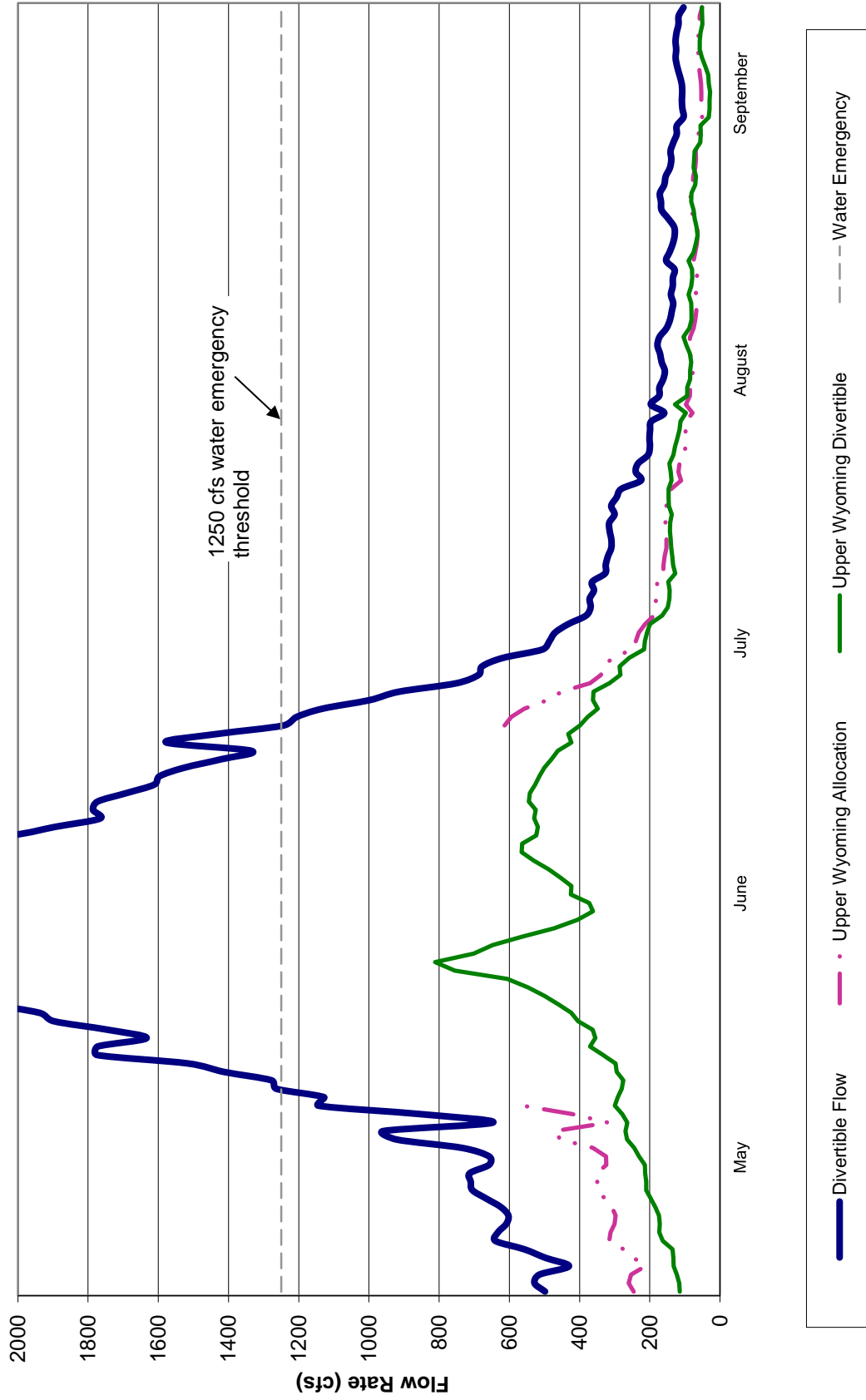


Figure 2010.9

**2010 - UPPER DIVISION
Lower Utah Section Diversion vs Allocation**

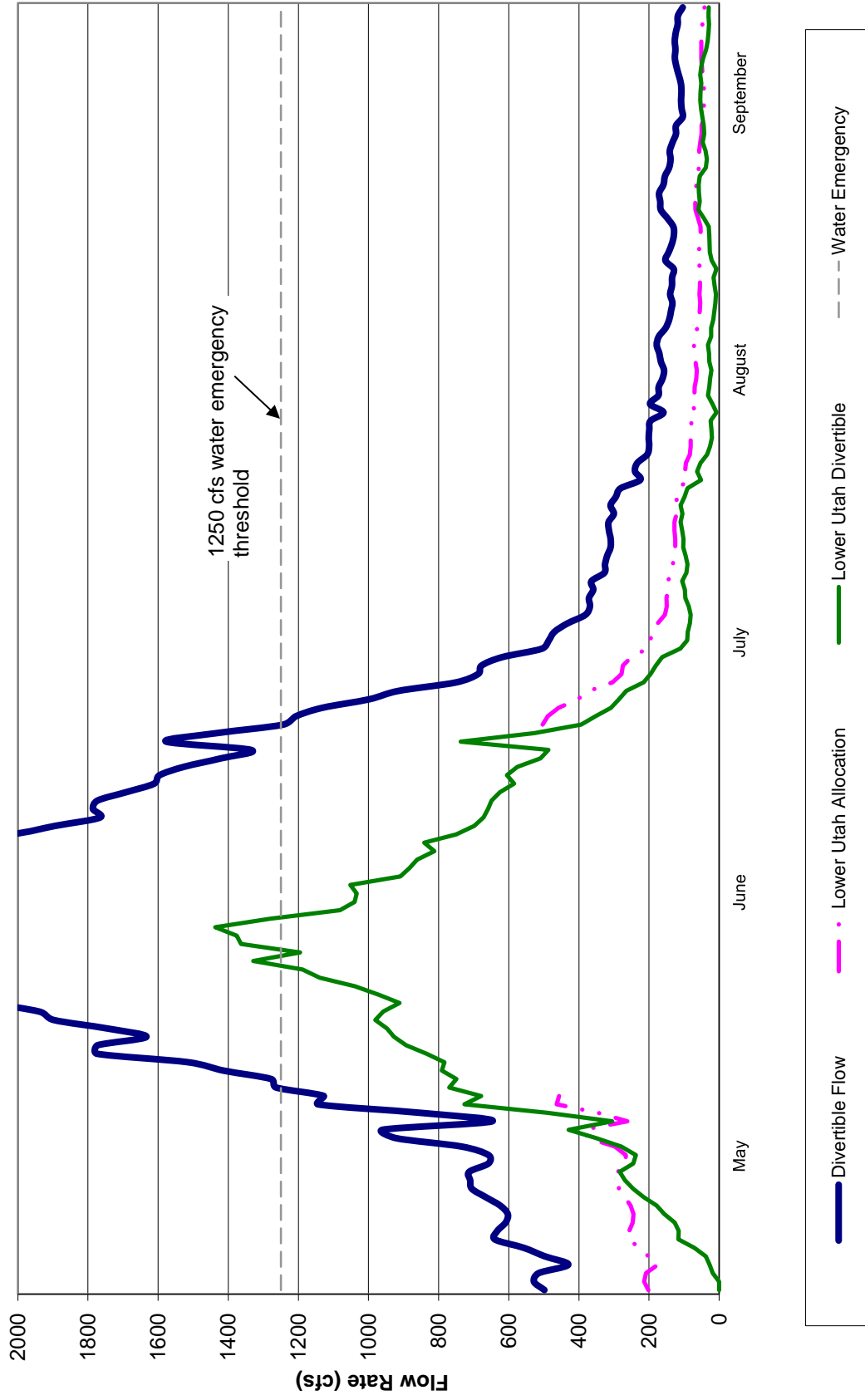


Figure 2010.10

2010

DAILY DISCHARGE IN CFS OF BEAR RIVER CANALS WITH COMPACT ALLOCATIONS IN THE UPPER DIVISION

July

Table with columns for days 1-31 and rows for various canal sections including UPPER UTAH SECTION, UPPER WYOMING SECTION, LOWER UTAH, LOWER WYOMING, and Bear River below Pixley Dam. Includes sub-totals for Upper and Lower Wyoming allocations and divertible flows.

NOTE:

"Chapman (Stataline)" is a second measurement of flows in the Chapman Canal. As such, the values are not re-added into the Upper Wyoming total. Whitney and Sulphur Creek Reservoirs supply storage to irrigators in the Upper Wyoming Section. Woodruff Narrows storage is credited 83% to the Lower Utah Section, Bear River and Francis Lee Canal irrigators, and 17% to Wyoming irrigators.

Figure 2010.11 (cont.)

2010

DAILY DISCHARGE IN CFS OF BEAR RIVER CANALS WITH COMPACT ALLOCATIONS IN THE UPPER DIVISION

August

Table with columns for days 1-31 and rows for various canal sections including UPPER UTAH SECTION, UPPER WYOMING SECTION, LOWER UTAH, and LOWER WYOMING. Each row lists a canal name and its corresponding daily discharge in CFS for each day of the month.

NOTE:

"Chapman (Steteline)" is a second measurement of flows in the Chapman Canal. As such, the values are not re-added into the Upper Wyoming total. Whitney and Sulphur Creek Reservoirs supply storage to irrigators in the Upper Wyoming Section. Woodruff Narrows storage is credited 83% to the Lower Utah Section, Bear River and Francis Lee Canal irrigators, and 17% to Wyoming irrigators.

Figure 2010.11 (cont.)

Central Division

The Compact provides that a water emergency may be declared when the divertible flow in the Central Division drops below 870 cfs. A water emergency may also be declared in the Central Division if the flow rate at the Border Gage drops below 350 cfs. The Compact provides that once a water emergency is deemed to exist, the State of Wyoming is to be restricted to 43 percent of the total divertible flow. The remaining 57 percent is available for use within Idaho.

Figures 2010.12 and 2010.13 graphically illustrate the Central Division's divertible flow and the respective allocations and diversions by the Wyoming and Idaho Sections under a water emergency. The flow passing the Border Gage is not illustrated on these figures, as it never impacted river regulation this year. It is important to note that on Figure 2010.13, the line labeled as "Available to Idaho" represents the summation of diversions within the State of Idaho, as well as flow passing Stewart Dam and diversion to the Rainbow Inlet Canal. As the Compact provides that 57 percent of the Central Division's divertible flow shall be available for use within Idaho, this line is used to show whether such provision of the Compact was met. However, the Compact also provides that if Idaho elects to not divert into its canals its full entitlement, a portion of its allocation can pass into the Lower Division via the Rainbow Inlet Canal or Stewart Dam. Data for this hydrograph are based on the River Commissioners'/Watermasters' annual reports to their respective state water agencies.

Figure 2010.14 (pages 10-23 through 10-27) shows a compilation of daily canal diversions as provided by the respective River Commissioners'/Watermasters. The Wyoming and Idaho Sections' diversions and allocations are tabulated and summarized at the bottom of each page. The pages are divided such that there is one month's data per page. As the flow of the Bear River at the Border Gage could also be critical to the declaration of a water emergency, as defined by the Compact, this gage's data are also shown in these tables.

As can be seen on the graphs and from the data, the water supply in the Central Division in 2010 was below the prior year, with natural streamflow below normal during May. Discharge from the Upper Division past Pixley Dam to the Central Division occurred during much of June, and the divertible flow was above the minimum water emergency trigger of 870 cfs until mid-July, by which time irrigation water demand had reduced. There was not a request from the water users for Compact distribution of the water supply and so a water emergency was not declared. There was good cooperation from the River Commissioners'/Watermasters in appropriately distributing the water supply.

2010 - CENTRAL DIVISION

Wyoming Section Diversion vs Allocation

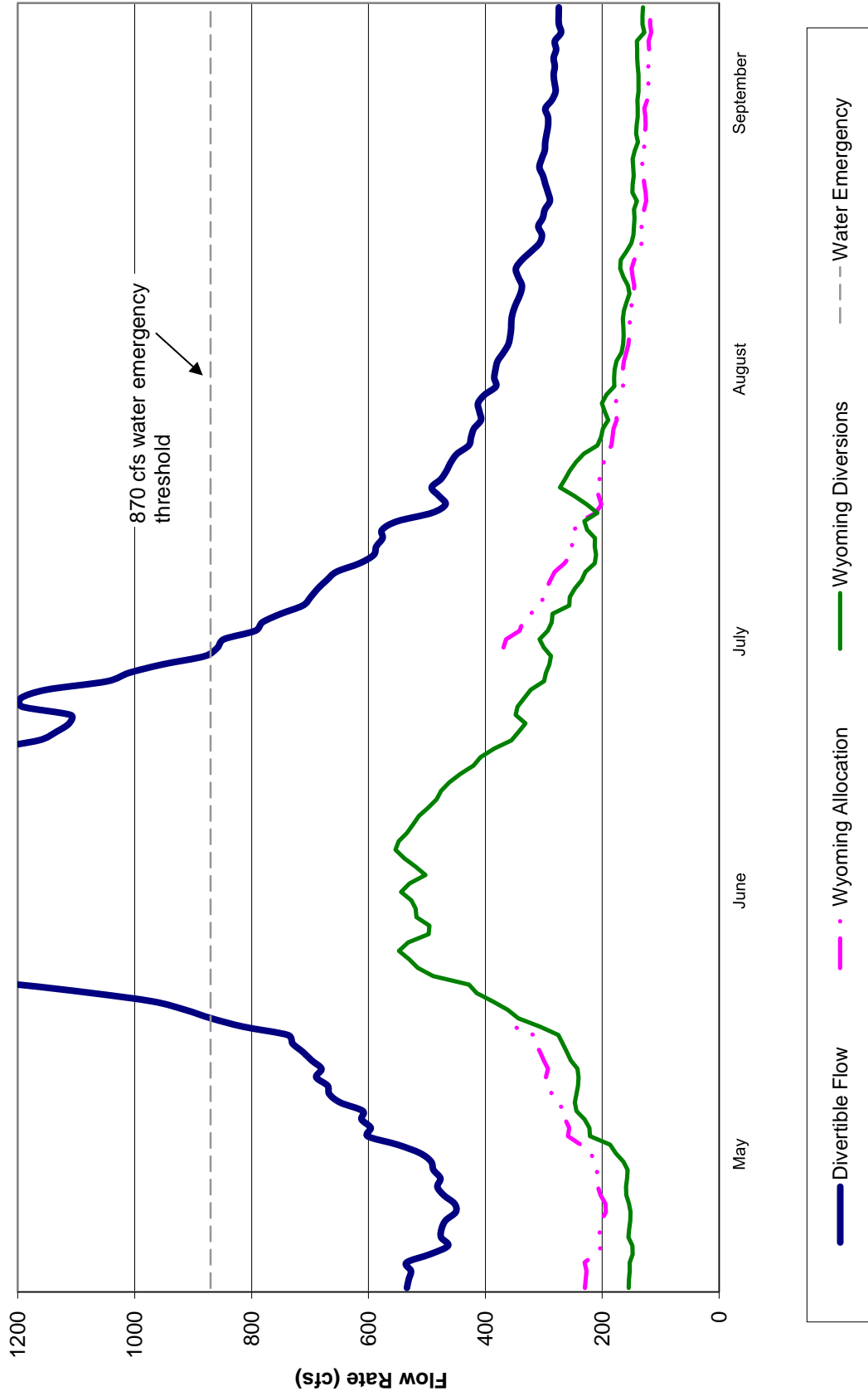


Figure 2010.12

2010 - CENTRAL DIVISION

Idaho Section Diversion vs Allocation

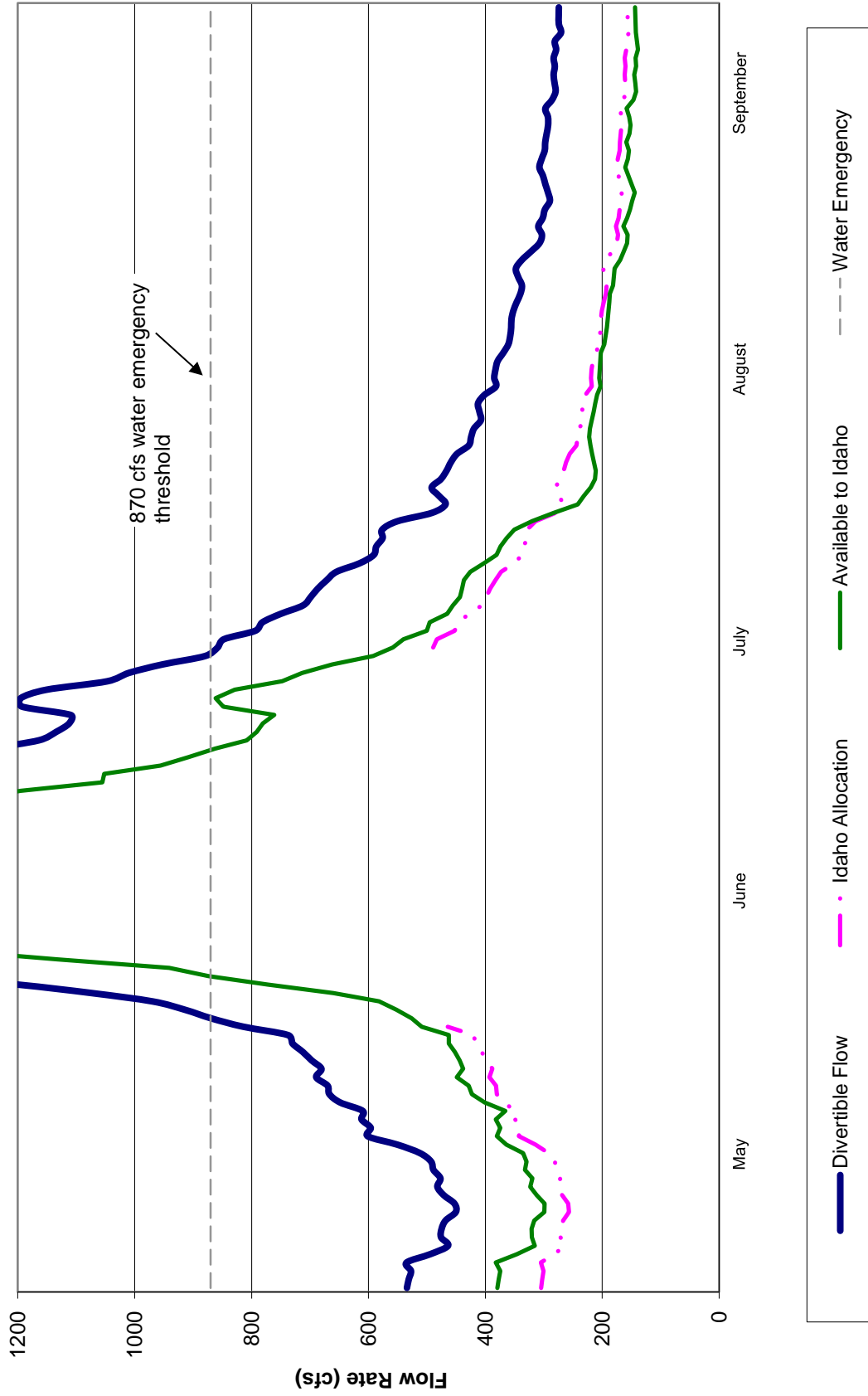


Figure 2010.13

August

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WYOMING DIVERSIONS
BEAR RIVER CANALS

Table with columns for dates (1-31) and rows for various diversion locations including Bridge Pump, Alonzo F. Sights (Main Stem), Wyman No. 1 (East), Wyman No. 2 (West), Oscar E. Snyder, Rocky Point (D2), Cook Bros, John R. Richards Terr, TRIBUTARY DIVERSIONS, etc.

Table with columns for dates (1-31) and rows for various diversion locations including Altona Storer (Sublette Cr), Gladstone (Glade Canyon Cr), D.C.P. (Bruner Cr), Curtis Pump (Bruner Cr), Haggerty No. 3 (Bruner Cr), Goodell (Pine Cr), V.H. (Pine Cr), Diamond No. 2 (Spring Cr), Meyon (Spring Cr), SHERMAN DIVERSIONS, Quinn-Bouzon, Francis-Larson, Buton Flat, Progress, Larson Pump, Nate North Pump, Nate South Pump, Emma, Severn C Ranch North Pilot Pump, etc.

Table with columns for dates (1-31) and rows for various diversion locations including Severn C Ranch South Pump & Pipeline, Coyote, Wheelock, Covey (Headgate), Covey (Bruner Cr), Covey (Spring Cr), Whites Water, South Branch Irr (N Branch), Reed Ditch (N Branch), Stoner & Nichols (N Branch), etc.

Table with columns for dates (1-31) and rows for various diversion locations including Gasteanga South (M Branch), Gasteanga North (M Branch), N Cokeville/ Morgan (M Branch), Tanner (M Branch), Star (M Branch), Star Two Pump (M Branch), Cokeville Water (M Branch), Igo No. 3 (M Branch), Igo No. 2 (M Branch), etc.

Table with columns for dates (1-31) and rows for various diversion locations including Preece Pump (S Branch), Bourne (S Branch), Folsom Irr (S Branch), Folsom Irr (N Branch), TOTAL WYOMING DIVERSIONS, IDAHO DIVERSIONS, Miller Ditch, Ripby, Nuffer Canal, etc.

Table with columns for dates (1-31) and rows for various diversion locations including Jensen Ditch, Lloyd Ditch, Dingle Irrigation Ditch, Ream Crockett Canal, Black Otter Canal, Preston Montebeller Canal, LaRocco Kent Canal, West Fork Canal, Planning Ditch, TOTAL IDAHO DIVERSIONS, Total Divertible Flow, Wyoming Diversions, Wyoming Allocation (43%), Idaho Diversions, etc.

Table with columns for dates (1-31) and rows for various diversion locations including Bear River below Stewart Dam, Sub Total, Idaho Allocation (57%), Bear River @ Border WY, etc.

Figure 2010.14 (cont.)

NOTE: Wyoming is limited to 43% of the total divertible flow. The remainder of the divertible flow is available for use within Idaho.

Lower Division

The Compact provides that a Utah Lower Division water user can petition the Commission for interstate regulation if he believes that he is being deprived of water to which he is justly entitled due to diversions in Idaho. If, upon review, the Commission finds such to be the case, then the Compact provides for the declaration of a water emergency and that it shall put into effect water delivery schedules based on priority of rights without regard to the state line. The Commission has never received such a petition. However, with growing concern for such a possibility, the Commission, over a several year period, determined how it would receive and review such a petition and implement water delivery should a water emergency be declared. At its November meeting in 1997 the Commission adopted *Interim Procedures for Lower Division Water Delivery*. Appendix B to the procedures, which was revised with the procedures in April, 2004, provides for the accounting and distribution method to be used in a water emergency.

Also appended to the procedures is *Water Delivery Schedule No. 1* which was revised by the Commission in 2006 and which includes the mainstem Lower Division water rights in both Idaho and Utah. After adoption of the water delivery schedule, both states began using this common schedule of water rights in their water right accounting programs. Hence, though not regulated by the Commission, the distribution in the Lower Division is cooperatively managed by the states of Idaho and Utah through their respective Watermasters and River Commissioners. Such distribution was facilitated in 2010 with weekly conference calls with the state agencies, large water users and PacifiCorp. Figure 2010.15 shows the delivery of water in the Lower Division as reported by the two state agencies.

2010 Lower Division Irrigation Water Deliveries

Canal/Group	Natural Flow (af)	Storage Use (af)	Total Diversion (af)
Idaho			
Gentile Valley	9,725	1,668	11,393
West Cache	30,980	7,097	38,077
Cub River Pumps	3,767	11,492	15,259
Last Chance and Bench B	50,012	17,159	67,171
Idaho Small Irrigators	5,684	1,252	6,936
Utah			
Bear River Canal Company	202,832	66,248	269,080
Utah Small Irrigators	2,677	6,407	9,084

Figure 2010.15

Allocation and deliveries of Bear Lake storage water are significant in most years to the total water diverted in the Lower Division. In 1995, PacifiCorp, the irrigators and Bear

Lake interests entered into a settlement agreement as to the allocation of storage water from Bear Lake. In 2004 the parties entered into an *Amended and Restated Bear Lake Settlement Agreement*. PacifiCorp tracks deliveries pursuant to the settlement agreement. Figure 2010.16 shows such deliveries in 2010.

2010 Bear Lake Storage Deliveries

Irrigation Storage Allocation	216,000 af
Bear Lake Storage Release	117,000 af
Lake Recovery Volume	99,000 af
Decreed Transit Losses	4,405 af
System Losses ¹	12,100 af
Delivered Bear Lake Storage	100,495 af

¹Water that passes below Cutler Dam that is accounted for as storage water release.

Figure 2010.16

Even with a lower than normal streamflow, irrigation storage use was well below the allocation, allowing Bear Lake levels to end the year near its beginning water level.

STATE WATER ACTIVITIES

Article XI of the Amended Compact provides that applications for appropriation or change in water use within each state shall be in accordance with individual state law, except no such application shall be approved if the effect will deprive water users within another state or increase the depletion beyond that which is provided for under the Compact. This article further requires that state officials report, in a format and at intervals established by the Commission, the status of their respective allocations and uses. The Commission has determined the best format for reporting such changes in use is the Biennial Report. Figure 0.3 in the Overview section of this report provides the most recent depletion information. This portion of the Biennial Report provides a summary of major water and water right related activities in each of the states during the 2010 water year.

Idaho

Water Activities

The projects funded by the stimulus grant from the Bureau of Reclamation, reported in the 2009 chapter of this report, were completed in 2010. Twenty eight new real-time monitoring stations were installed on diversions in the central and lower divisions.

Water Rights

In Basin 11, one domestic permit was issued for 0.02cfs. One lapsed permit for 1.26cfs of irrigation from groundwater was reinstated and its priority date was advanced to 2010. There were two approved transfers, one on Co-op Creek that changed the place of use and point of diversion. The other transfer adjusted the place of use for the water right in the Central Division associated with the Retreat at Bear Lake. The transfer updated the place of use in the same general area as described in the old decree to how it is currently irrigating.

Several new permits were issued in Basin 13. Two stockwater and one domestic permit were issued. The City of Franklin was granted a permit for 1.6cfs for power from springs and groundwater. One application was filed for 0.13cfs from groundwater for domestic purposes. The application is in the groundwater management area and there have been several protests filed. No permit has been issued on this application. There were seven approved transfers in Basin 13. The transfers were for changes in the places of use and the points of diversion. There are four applications for transfers that have yet to be approved. Preston Whitney Irrigation Company has two active transfers for changes in the place of use and point of diversion. The transfer's intent is to more accurately define the historical place of use.

There were several applications, permits and transfers filed in Basin 15. Two water right permits were issued and two additional applications have been filed. The two permits were for diversion of 5cfs and 9.6cfs from groundwater for irrigation. Both permits had previously lapsed and were reissued with a 2010 priority date. One of the applications was for 1.23cfs from groundwater for irrigation. The other application was for 1.51cfs from the Malad River for diversion to storage and irrigation. Several protests have been filed against the applications. Two transfers were approved in Basin 15, both for changes in the place of use.

Utah

Water Activities

The right-of-way study, or Concept Report, for the Bear River Pipeline is in its final draft stage. It should be finalized by summer of 2011. The study has established a recommended alignment for the pipeline from the proposed Washakie Reservoir to WBWCD's Slaterville Diversion west of Ogden. The study also includes the cost estimate for the entire Bear River Development Project (Project), not just for the pipeline, which includes the development of 220,000 ac-ft of Bear River water. The most immediate future tasks concerning the Project include public involvement planning, a review of previously studied reservoir sites and discussions with UDOT about possible right-of-way options for the pipeline.

The Utah Board of Water Resources authorized a project proposed by Cache Highline Water Association (made up of Logan & Northern Irrigation Company and Logan, Hyde Park & Smithfield Canal Company) to restore water to Logan & Northern shareholders due to the canal's failure in 2009. The nearly \$28.6 million project proposed by the association would include moving the Logan & Northern Canal diversion on the Logan River upstream approximately 1.5 miles to that of the Logan, Hyde Park & Smithfield (LHPS) Canal, combining both canal flows. The LHPS Canal would be enclosed from its diversion to approximately 3100 North Street. A pipeline would be installed between it and the Logan & Northern Canal and also southward to deliver water to users. Water would also be released into the Logan & Northern Canal at that point to flow northward. The NRCS has prepared a Draft EIS which investigates several alternatives. Public comment is being received on the Draft EIS after which the NRCS will address any issues and make a record of decision in the fall of 2011.

The Utah Board of Water Resources also funded a \$320,000 project sponsored by the Logan & Northern Irrigation to install a pipeline between the LHPS and Logan & Northern Canals at approximately 4800 North Street. This project is complete and is in operation.

A cloud seeding project to increase snowpack has been ongoing since 1989 in the Lower Division in Eastern Box Elder County and Cache County. The winter storm systems in these areas are being seeded with ground-based generators using silver iodide. Bear River Water Conservancy District and Cache County cost shared (50/50) with the Utah Board of Water Resources in the cloud seeding project during the 2010 water year.

Water Rights

There were 27 applications that were approved in Utah during 2010 for groundwater for ordinary "domestic and stockwatering" purposes and associated irrigation use for 34 homes.

In the Upper Division in Rich County, an application by the Beckwith-Quinn Westside Canal Company was approved for the irrigation of 195.13 acres. In the Lower Division, in Box Elder County below Cutler Dam, five applications were approved for a

total of 151.37 acres of irrigation. Of that amount, US Fish and Wildlife Service was approved for 12.37 cfs for the purpose of irrigation of 131.62 acres of wildlife habitat from Three Mile Creek.

Change applications were also approved to change the nature and/or place of use of historic water rights. Most notably, due to the canal break of 2009, a temporary change was approved for Logan & Northern Irrigation. Temporary changes were also approved for pipeline construction of Ruby Pipeline.

Wyoming

Water Activities

The Wyoming State Engineer’s Office has embarked on an ambitious project to modernize the paper water rights system and provide for searching and processing water rights electronically. This is a multi-year project, but the “go-live” date for processing applications electronically occurred during this reporting period. Much work remains to assure that entries in the data base are accurate, but much water right verification work can now be accomplished without pulling the original paper water rights records.

The telemetry project continues and equipment was installed at the Whitney Reservoir. Due to the remoteness of this facility, being able to remotely check the status of releases from this facility decreases the number of physical trips taken to this mountain reservoir.

During this year, the three states discussed a question that was raised about the possibility of delivering a small portion of Wyoming shareholders’ entitled water from Woodruff Narrows Reservoir storage downstream across the Pixley Dam and into the Central Division.

Water Rights

New water right permits with Compact depletions issued from Wyoming's allowances are as follows:

<u>Permit No.</u>	<u>Appropriator</u>	<u>Depletion Allocation</u>	<u>Priority Date</u>
U.W. 113469	United States of America, Fish and Wildlife Service	2.64 acre-feet	Dec. 17, 1998
U.W. 191651	Jason Thornock and State Board of Land Commissioners	266.81 acre-feet	Oct. 1, 2009
U.W. 192875	Michael and Cathleen Kessenich	5.20 acre-feet	Mar. 29, 2010
U.W. 193097	Marvel L. Reed	8.36 acre-feet	Feb. 5, 1987
34273	John B. and Patricia R. Carricaburu	0.83 acre-feet	Sept. 25, 2009
34396	Jason J. and Tracy Thornock	0.58 acre-feet	Feb. 12, 2010
7639 Enl.	James Buckley	1.18 acre-feet	Sept. 16, 2009

STREAM GAGING

As was indicated in the "Overview" chapter of this report under the subsection concerning the "Stream Gaging Program" (see page O-14), the Bear River Commission participates in a cooperative contract with the USGS for the maintenance of stream gages on the Bear River and significant tributaries. Also, the states, PacifiCorp and, at times, others participate in stream gaging on the Bear River and its tributaries. The Commission believes the collection of data concerning stream flows in the Bear River system is very important and allocates about half of its annual budget in support of the cooperative stream gaging program with the U.S. Geological Survey. However, costs continue to increase and so the Commission is constantly reviewing the stream gaging program to determine if all of the stations supported are necessary for the Commission to help the Commission fulfill the responsibilities assigned to it by the Compact. There were no changes to the Commission's stream gaging program in 2010.

During 2010, a total of 32 gages were maintained on the Bear River system. Of these 32 gages, eight were part of a cooperative effort between the Bear River Commission and the USGS, and the USGS funded four gages under NSIP. PacifiCorp maintained 15 gages on the Bear River system during 2010. Four additional gages were maintained under the USGS Cooperative Program with the State of Utah (3 gages) and the State of Idaho (1 gage). Additionally, the State of Wyoming maintained one gage on the Bear River. Figure 2010.17 shows a tabulation of these gages and the entities which participated in the operation and funding of each gage. The approximate locations of the stream gages are shown on Figure O.5 in the Overview section of this report.

Publication of the streamflow records for 12 of the gages in this report were considered to be of significant value to the Commission and are included on pages 10-35 through 10-47.

BEAR RIVER SYSTEM STREAM GAGING STATIONS STREAM GAGES MAINTAINED DURING THE 2010 WATER YEAR

STATION #	STATION NAME	OPERATED BY	MEASUREMENT FUNDED BY	PUBLICATION FUNDED BY
<u>10011500</u> •¥	Bear River near UT-WY state line	USGS	USGS	USGS
10016900•¥	Bear River at Evanston WY	USGS-WY	USGS	USGS
<u>10020100</u> •	Bear River above reservoir near Woodruff UT	USGS	BRC/USGS	BRC/USGS
<u>10020300</u> •	Bear River below reservoir near Woodruff UT	USGS	BRC/USGS	BRC/USGS
10023000•	Big Creek near Randolph UT	USGS	UTDNR/USGS	UTDNR/USGS
10026500•	Bear River near Randolph UT	WY	State of WY	WSE/WY-USGS
<u>10028500</u> *•	Bear River below Pixley Dam near Cokeville WY	USGS	BRC/USGS	BRC/USGS
<u>10032000</u> •	Smiths Fork near Border WY	USGS	BRC/USGS	BRC/USGS
10038000•¥	Bear River below Smiths Fork near Cokeville WY	USGS	USGS	USGS
<u>10039500</u> •¥	Bear River at Border WY	USGS	BRC/USGS	BRC/USGS
10044300	Dingle Inlet Canal near Dingle ID	PacifiCorp	PacifiCorp	not published
<u>10046000</u>	Rainbow Inlet Canal near Dingle ID	PacifiCorp	PacifiCorp	PacifiCorp
10046500 ¹	Bear River below Stewart Dam near Montpelier ID	PacifiCorp	PacifiCorp	not published
<u>10055500</u>	Bear Lake at Lifton near St. Charles ID	PacifiCorp	PacifiCorp	PacifiCorp
<u>10059500</u>	Bear Lake Outlet Canal near Paris ID	PacifiCorp	PacifiCorp	PacifiCorp
10068500•	Bear River at Pescadero ID	USGS	IDDNR/USGS	IDDNR/USGS
10075000	Bear River at Soda Springs ID	PacifiCorp	PacifiCorp	PacifiCorp
10079000	Soda Point Reservoir at Alexander ID	PacifiCorp	PacifiCorp	PacifiCorp
10079500	Bear River at Alexander ID	PacifiCorp	PacifiCorp	PacifiCorp
10080000	Bear River below Grace Dam near Grace ID	PacifiCorp	PacifiCorp	PacifiCorp
10086000	Oneida Narrows Reservoir at Oneida ID	PacifiCorp	PacifiCorp	PacifiCorp
10086500	Bear River below PacifiCorp Tailrace at Oneida ID	PacifiCorp	PacifiCorp	PacifiCorp
<u>10092700</u> •	Bear River at ID-UT state line	USGS	BRC/USGS	BRC/USGS
10105900•	Little Bear River at Paradise UT	USGS	UTDNR/USGS	UTDNR/USGS
10108400	Logan, Hyde Park, Smithfield Canal near Logan UT	USGS	UTDNR/USGS	UTDNR/USGS
<u>10109000</u> ²	Logan River above State Dam near Logan UT	USGS	BRC/USGS	BRC/USGS
10113500•¥	Blacksmith Fork above Upper & Lower Dam Near Hyrum UT	USGS	USGS	USGS
10116500	Cutler Reservoir near Collinston UT	PacifiCorp	PacifiCorp	PacifiCorp
10117000	Hammond (east side) Canal near Collinston UT	PacifiCorp	PacifiCorp	PacifiCorp
10117500	West Side Canal near Collinston UT	PacifiCorp	PacifiCorp	PacifiCorp
10118000	Bear River near Collinston UT	PacifiCorp	PacifiCorp	PacifiCorp
<u>10126000</u> •	Bear River near Corinne UT	USGS	BRC/USGS	BRC/USGS

- ▲ Stations which are equipped with DCPs.
- * Seasonal stations
- ¥ NSIP site

Note: Underlined station numbers indicate those gages for which stream flow data is published in this report.

¹ Discharge measurements below Stewart Dam are required for interstate regulation pursuant to the Compact. However, flow is general only a few cfs. PacifiCorp maintains this gage and reports discharge to the Idaho watermaster. The data are included with the Central Division's canal diversion data herein.

² Gage 10109001 represents a summation of the Logan River discharge (10109000) and canal diversions (10108400) upstream of the gage. Gage 10109000 is part of the cooperative program with the USGS and the BRC, while gage 10108400 is maintained under the USGS cooperative program with the State of Utah. Of importance to the Commission, and published herein, is the combined flow of these two gages.

Figure 2010.17

10011500 BEAR RIVER NEAR UTAH-WYOMING STATE LINE

LOCATION.--Lat 40°57'55", long 110°51'10" referenced to North American Datum of 1927, in SE ¼ NW ¼ SE ¼ sec.30, T.3 N., R.10 E., Summit County, UT, Hydrologic Unit 16010101, on left bank 400 ft downstream from West Fork and 2.8 mi upstream from Utah-Wyoming State line.

DRAINAGE AREA.--172 mi².

PERIOD OF RECORD.--July 1942 to current year.

REVISED RECORDS.--WDR UT-74-1: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 7,965 ft above NGVD of 1929, from river-profile map. Prior to October 1, 1986 at datum 3.0 ft lower.

REMARKS.--Records fair except for estimated daily discharges, which are poor. Flow regulated slightly by Whitney Reservoir, total capacity, 4,700 acre-ft since 1966. Three diversions above station for irrigation of about 265 acres above and 2,600 acres below station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,240 ft³/s, Jun 8, 2010, gage height, 7.72 ft; minimum, 6.8 ft³/s, Apr 12, 1984, result of upstream ice jam.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,100 ft³/s and (or) maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Jun 8	0015	*3,240	*7.72

Minimum daily discharge, 18 ft³/s, Dec.10.

DISCHARGE, CUBIC FEET PER SECOND WATER YEAR OCTOBER 2009 TO SEPTEMBER 2010 DAILY MEAN VALUES [e, estimated]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	91	60	42	e36	e32	e24	30	103	834	524	136	116
2	86	57	39	e34	e28	e25	34	95	826	483	165	118
3	94	55	e28	e30	e32	e25	29	89	1,010	424	150	122
4	93	54	e24	e28	e32	e25	32	101	1,210	381	137	112
5	95	55	e28	e32	e36	e23	30	98	1,640	335	188	99
6	81	56	e26	e36	e38	e22	30	108	2,120	297	143	97
7	72	53	e22	e30	e36	e27	e28	95	e2,080	254	138	95
8	72	49	e22	e23	e30	e26	e24	106	e2,390	245	131	90
9	62	e42	e20	e34	e26	e26	e32	125	e2,090	243	125	86
10	64	e46	e18	e32	e28	e24	e35	139	1,710	256	120	e77
11	64	50	e22	e30	e30	e22	40	156	1,120	225	110	78
12	64	54	e28	e36	e32	e31	41	126	907	199	105	69
13	66	50	e32	e38	e32	e29	45	116	736	185	102	64
14	75	e22	e30	e36	e30	e24	29	112	555	196	108	63
15	75	e24	e28	e30	e30	25	38	118	518	225	106	63
16	66	e30	e32	e34	e28	27	71	167	660	213	103	61
17	65	e40	e28	e36	e29	27	91	279	e815	204	103	59
18	64	51	e25	e38	e27	28	103	366	920	193	104	57
19	65	46	e22	e36	e28	27	125	362	1,070	187	124	55
20	66	46	e26	e36	e30	32	164	366	1,120	190	141	53
21	65	44	e28	e38	e28	32	217	434	1,050	203	118	59
22	63	43	e32	e38	e26	29	206	475	976	201	109	64
23	59	e38	e32	e34	e24	27	164	362	860	185	108	78
24	62	e30	e26	e30	e27	29	139	336	866	158	91	73
25	54	e34	e28	e28	e28	29	133	302	866	136	79	66
26	48	e40	e24	e30	e27	26	128	388	781	128	77	62
27	62	e42	e27	e34	e26	28	153	584	719	133	81	60
28	47	43	e28	e32	e24	31	165	846	640	146	135	58
29	57	41	e32	e26	---	29	123	831	596	145	100	56
30	58	43	e34	e30	---	31	103	679	561	153	101	53
31	60	---	e32	e36	---	31	---	761	---	137	123	---
Total	2,115	1,338	865	1,021	824	841	2,582	9,225	32,246	7,184	3,661	2,263
Mean	68.2	44.6	27.9	32.9	29.4	27.1	86.1	298	1,075	232	118	75.4
Max	95	60	42	38	38	32	217	846	2,390	524	188	122
Min	47	22	18	23	24	22	24	89	518	128	77	53
Ac-ft	4,200	2,650	1,720	2,030	1,630	1,670	5,120	18,300	63,960	14,250	7,260	4,490

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1943 - 2010, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	64.4	54.4	45.6	41.4	39.6	43.5	112	602	833	291	93.0	73.8
Max	208	106	94.9	72.4	64.3	69.0	316	1,044	1,990	1,105	244	229
(WY)	(1983)	(1984)	(1984)	(1984)	(1984)	(1986)	(1946)	(1984)	(1986)	(1995)	(1965)	(1983)
Min	30.8	32.5	27.7	28.9	21.1	26.0	37.2	162	204	67.4	31.0	23.9
(WY)	(1959)	(1955)	(1960)	(2007)	(2003)	(1964)	(1944)	(1977)	(1992)	(1961)	(2002)	(1956)

Figure 2010.17 (cont.)

10020100 BEAR RIVER ABOVE RESERVOIR, NEAR WOODRUFF, UT

LOCATION.--Lat 41°26'04", long 111°01'01" referenced to North American Datum of 1927, in NE ¼ NW ¼ NW ¼ sec.29, T.17 N., R.120 W., Uinta County, WY, Hydrologic Unit 16010101, on right bank 9.3 mi upstream from Woodruff Narrows Dam and 10 mi southeast of Woodruff.
 DRAINAGE AREA.--755 mi².
 PERIOD OF RECORD.--October 1961 to current year.
 REVISED RECORDS.--WDR UT-74-1: Drainage area.
 GAGE.--Water-stage recorder. Elevation of gage is 6,455 ft above NGVD of 1929, from river-profile map.
 REMARKS.--Records good except for estimated daily discharges, which are fair. Diversion for irrigation of about 43,500 acres above station.
 EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,150 ft³/s, Jun 2, 1983, gage height, 6.17 ft; minimum, no flow several days during Aug, Sep 1988, and Sep 2002.
 EXTREMES FOR CURRENT YEAR.--Maximum discharge, 3,370 ft³/s, Jun 9, gage height, 5.91 ft; minimum daily discharge, 5.8 ft³/s, Sep 30.

DISCHARGE, CUBIC FEET PER SECOND WATER YEAR OCTOBER 2009 TO SEPTEMBER 2010 DAILY MEAN VALUES [e, estimated]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	40	30	42	e25	e32	e38	52	231	1,050	269	26	34
2	40	32	45	e24	e30	e40	54	233	1,100	236	26	30
3	28	30	e30	e20	e33	e44	51	243	1,070	218	23	30
4	26	25	e26	e18	e34	e44	50	222	1,280	189	23	32
5	42	19	e24	e20	e36	e42	47	233	1,510	164	20	33
6	57	17	e20	e26	e38	e40	48	201	1,910	148	36	34
7	48	16	e15	e22	e35	e43	46	190	2,210	135	28	33
8	43	17	e12	e16	e32	e46	42	168	2,660	e124	23	34
9	32	14	e10	e20	e30	e49	40	157	3,060	e122	19	33
10	26	14	e10	e22	e32	e48	42	160	2,540	e117	16	39
11	25	14	e13	e22	e36	e45	48	173	2,490	e101	13	36
12	27	19	e18	e24	e39	e47	109	231	2,230	e80	10	31
13	27	e19	e22	e26	e42	e50	148	262	2,120	e78	23	32
14	28	e18	e24	e28	e38	e52	160	270	1,840	e66	41	29
15	33	e10	e20	e25	e42	e50	161	280	1,370	e55	46	25
16	38	e10	e26	e26	e42	e50	289	236	1,140	e52	43	24
17	33	e10	e24	e29	e44	e52	510	232	1,270	e41	37	24
18	27	e37	e20	e31	e45	e54	783	331	1,230	e36	34	22
19	26	60	e18	e30	e42	e52	659	582	1,030	e28	37	22
20	30	51	e20	e28	e40	e48	522	611	963	e28	43	23
21	28	48	e22	e31	e36	e50	479	562	871	e23	45	20
22	25	48	e26	e33	e36	41	503	665	789	e26	36	23
23	23	45	e28	e32	e35	45	451	732	690	e26	38	19
24	23	42	e25	e28	e36	51	354	701	552	23	33	15
25	22	35	e22	e25	e40	54	361	711	512	20	35	13
26	21	46	e21	e27	e38	50	487	655	490	20	29	10
27	18	52	e21	e30	e42	46	402	730	454	27	27	8.2
28	16	49	e18	e29	e40	43	321	889	413	31	35	6.4
29	25	43	e22	e26	---	40	326	1,160	352	30	40	6.3
30	15	40	e26	e30	---	39	258	1,150	302	32	31	5.8
31	27	---	e29	e34	---	45	---	989	---	29	33	---
Total	919	910	699	807	1,045	1,438	7,803	14,190	39,498	2,574	949	726.7
Mean	29.6	30.3	22.5	26.0	37.3	46.4	260	458	1,317	83.0	30.6	24.2
Max	57	60	45	34	45	54	783	1,160	3,060	269	46	39
Min	15	10	10	16	30	38	40	157	302	20	10	5.8
Ac-ft	1,820	1,800	1,390	1,600	2,070	2,850	15,480	28,150	78,340	5,110	1,880	1,440

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1962 - 2010, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	66.4	67.2	65.5	62.7	76.1	154	312	781	810	179	46.9	45.8
Max	437	198	181	147	312	627	671	1,957	2,564	1,191	340	288
(WY)	(1983)	(1974)	(1984)	(1984)	(1986)	(1986)	(1969)	(1984)	(1986)	(1995)	(1983)	(1983)
Min	3.03	6.06	7.21	6.76	10.4	26.8	77.7	104	54.6	4.41	0.68	0.49
(WY)	(1965)	(1989)	(1989)	(1989)	(2003)	(1977)	(1977)	(1977)	(1992)	(2000)	(2000)	(1988)

Figure 2010.17 (cont.)

10020300 BEAR RIVER BELOW RESERVOIR, NEAR WOODRUFF, UT

LOCATION.--Lat 41°30'20", long 111°00'50" referenced to North American Datum of 1927, in NE ¼ NE ¼ NW ¼ sec.32, T.18 N., R.120 W., Uinta County, WY, Hydrologic Unit 16010101, on right bank 1,100 ft downstream from Woodruff Narrows Dam, 1.6 mi upstream from Salt Creek, 5.4 mi upstream from Wyoming-Utah State line, and 7.7 mi east of Woodruff.

DRAINAGE AREA.--784 mi².

PERIOD OF RECORD.--October 1961 to current year.

REVISED RECORDS.--WDR UT-74-1: Drainage area.

GAGE.--Water-stage recorder and concrete control. Datum of gage is 6,398.96 ft above NGVD of 1929. Prior to September 26, 1962, at site 175 ft upstream at same datum.

REMARKS.--Records good. Flow regulated by Woodruff Narrows Reservoir (station 10020200) beginning January 1962. Diversions for irrigation of about 43,500 acres above station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,820 ft³/s, Jun 2, 1983, gage height, 8.26 ft; no flow Jul 4, 5, 1962, Aug. 30, 31, Sep 1, 2, 6, 7, 1979, Oct 30, 1980.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 2,910 ft³/s, Jun 10; minimum daily discharge, 11 ft³/s, on many days.

DISCHARGE, CUBIC FEET PER SECOND WATER YEAR OCTOBER 2009 TO SEPTEMBER 2010 DAILY MEAN VALUES

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	24	15	12	11	11	11	12	299	923	767	69	50
2	24	15	12	11	11	11	11	278	948	765	69	50
3	24	14	12	11	11	11	11	285	935	765	70	50
4	25	14	12	12	11	11	11	251	1,010	755	70	51
5	24	14	12	11	11	11	11	250	1,130	361	71	51
6	26	14	12	11	11	11	11	238	1,400	121	72	51
7	26	14	13	11	11	11	11	221	1,750	121	72	51
8	25	13	13	12	11	11	11	202	2,220	96	72	51
9	24	13	13	12	11	11	11	185	2,770	77	71	52
10	24	13	13	12	11	11	12	188	2,910	79	70	52
11	24	13	13	12	11	11	11	208	2,740	79	70	52
12	24	13	12	12	11	11	11	245	2,510	80	70	52
13	25	13	12	12	11	11	11	264	2,210	80	70	52
14	25	13	12	12	11	11	11	279	1,950	80	59	52
15	25	13	12	12	11	11	11	294	1,580	81	50	52
16	25	13	12	12	11	11	12	278	1,280	80	50	52
17	25	13	12	12	11	11	12	265	1,300	81	49	52
18	25	13	12	12	11	12	12	305	1,280	80	49	45
19	25	13	12	12	11	12	12	413	1,140	80	49	37
20	25	13	12	12	11	12	64	479	1,050	81	49	37
21	25	13	12	12	11	12	229	813	976	80	49	37
22	25	13	12	12	11	12	370	861	909	81	49	38
23	25	13	12	12	11	12	431	838	849	80	50	37
24	25	13	12	12	11	12	435	817	800	73	50	37
25	25	12	12	12	11	12	396	764	785	68	50	37
26	25	12	12	11	11	12	441	721	784	68	50	37
27	25	12	12	11	11	12	475	701	783	68	50	38
28	26	12	12	11	11	12	409	747	783	67	50	38
29	26	12	12	11	---	12	372	825	780	68	50	37
30	22	12	12	11	---	12	327	908	774	68	50	38
31	15	---	11	11	---	12	---	912	---	68	50	---
Total	758	393	376	360	308	355	4,164	14,334	41,259	5,498	1,819	1,366
Mean	24.5	13.1	12.1	11.6	11.0	11.5	139	462	1,375	177	58.7	45.5
Max	26	15	13	12	11	12	475	912	2,910	767	72	52
Min	15	12	11	11	11	11	11	185	774	67	49	37
Ac-ft	1,500	780	746	714	611	704	8,260	28,430	81,840	10,910	3,610	2,710

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1962 - 2010, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	52.0	48.3	42.7	40.8	42.5	86.7	249	751	953	262	73.2	58.2
Max	425	421	184	153	171	473	891	1,828	2,437	913	331	278
(WY)	(1983)	(1983)	(1983)	(1985)	(1971)	(1972)	(1985)	(1984)	(1983)	(1975)	(1983)	(1983)
Min	3.89	0.12	4.28	4.37	4.71	4.70	0.34	27.8	356	10.5	3.91	3.65
(WY)	(1990)	(1981)	(1978)	(1978)	(1978)	(1978)	(1977)	(1977)	(2002)	(2002)	(1979)	(1979)

Figure 2010.17 (cont.)

10028500 BEAR RIVER BELOW PIXLEY DAM, NEAR COKEVILLE, WY

LOCATION.--Lat 41°56'20", long 110°59'05" referenced to North American Datum of 1927, in SW ¼ SE ¼ SE ¼ sec.25, T.23 N., R.120 W., Lincoln County, WY, Hydrologic Unit 16010102, 800 ft downstream from Pixley Dam, 11 mi south of Cokeville, and 17.5 mi downstream from Twin Creek.

DRAINAGE AREA.--2,032 mi².

PERIOD OF RECORD.--October 1941 to November 1943 (published as Bear River near Cokeville), October 1952 to September 1956, May 1958 to current year (seasonal only). Monthly discharge only for some periods, published in WSP 1314.

REVISED RECORDS.--WDR UT-74-1: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 6,185 ft above NGVD of 1929, from river-profile map. October 31, 1941 to November 30, 1943, at site 200 ft downstream at different datum. September 24, 1952 to August 31, 1994 at site 50 ft downstream at same datum.

REMARKS.--Records fair. Natural flow of stream affected by diversions for irrigation, return flow from irrigated areas, and regulation by upstream reservoirs.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 2,300 ft³/s, Mar 25, 1956; minimum daily discharge, 0.09 ft³/s, Sep 8, 2002.

DISCHARGE, CUBIC FEET PER SECOND WATER YEAR OCTOBER 2009 TO SEPTEMBER 2010 DAILY MEAN VALUES

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	58	---	---	---	---	---	---	204	58	304	50	35
2	59	---	---	---	---	---	---	211	79	294	46	34
3	55	---	---	---	---	---	---	172	96	288	44	33
4	58	---	---	---	---	---	---	65	108	321	40	31
5	---	---	---	---	---	---	---	85	119	329	31	29
6	---	---	---	---	---	---	40	93	128	321	30	29
7	---	---	---	---	---	---	42	89	177	316	31	28
8	---	---	---	---	---	---	41	83	348	330	34	28
9	---	---	---	---	---	---	39	69	430	358	42	26
10	---	---	---	---	---	---	39	61	533	274	53	26
11	---	---	---	---	---	---	40	64	563	230	56	26
12	---	---	---	---	---	---	40	62	618	183	54	27
13	---	---	---	---	---	---	41	58	702	172	46	27
14	---	---	---	---	---	---	43	52	853	181	38	27
15	---	---	---	---	---	---	44	48	959	178	34	27
16	---	---	---	---	---	---	41	42	966	167	37	26
17	---	---	---	---	---	---	34	37	935	168	38	27
18	---	---	---	---	---	---	34	35	899	157	38	27
19	---	---	---	---	---	---	34	31	855	141	35	26
20	---	---	---	---	---	---	34	27	804	129	33	26
21	---	---	---	---	---	---	32	26	747	122	32	27
22	---	---	---	---	---	---	17	26	694	119	31	28
23	---	---	---	---	---	---	4.4	26	600	107	32	29
24	---	---	---	---	---	---	13	26	538	100	34	30
25	---	---	---	---	---	---	41	32	493	95	32	31
26	---	---	---	---	---	---	56	45	356	90	31	36
27	---	---	---	---	---	---	65	49	326	78	30	37
28	---	---	---	---	---	---	218	40	320	58	30	33
29	---	---	---	---	---	---	206	35	318	57	29	28
30	---	---	---	---	---	---	199	34	310	56	33	17
31	---	---	---	---	---	---	---	40	---	54	35	---
Total	---	---	---	---	---	---	---	1,967	14,932	5,777	1,159	861
Mean	---	---	---	---	---	---	---	63.5	498	186	37.4	28.7
Max	---	---	---	---	---	---	---	211	966	358	56	37
Min	---	---	---	---	---	---	---	26	58	54	29	17
Ac-ft	---	---	---	---	---	---	---	3,900	29,620	11,460	2,300	1,710

Figure 2010.17 (cont.)

10032000 SMITHS FORK NEAR BORDER, WY

LOCATION.--Lat 42°17'36", long 110°52'18" referenced to North American Datum of 1927, in NE ¼ SW ¼ SW ¼ sec.28, T.27 N., R.118 W., Lincoln County, WY, Hydrologic Unit 16010102, on left bank 4.9 mi upstream from Howland Creek, 5.6 mi downstream from Hobble Creek, and 12.4 mi northeast of Border.

DRAINAGE AREA.--165 mi².

PERIOD OF RECORD.--May 1942 to current year.

REVISED RECORDS.--WSP 1734: 1952(M).

GAGE.--Water-stage recorder and crest-stage gage. Elevation of gage is 6,720 ft above NGVD of 1929, from topographic map. Prior to October 16, 1945, at site 1.2 mi downstream at different datum. October 16, 1945 to November 1986 at site 0.4 mi downstream at different datum.

REMARKS.--Records good except for estimated daily discharges, which are poor. One diversion for irrigation of about 200 acres above station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,100 ft³/s, Jun 4, 1986, gage height, 5.66 ft; minimum, 19 ft³/s, Feb 28, 2007.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 797 ft³/s, Jun 8, gage height, 2.90 ft; minimum daily discharge, 50 ft³/s, on several days.

DISCHARGE, CUBIC FEET PER SECON WATER YEAR OCTOBER 2009 TO SEPTEMBER 2010 DAILY MEAN VALUES

[e, estimated]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	116	96	e80	e70	e64	e54	57	154	360	387	182	123
2	112	94	e78	e66	e60	e52	55	149	394	370	175	121
3	113	92	e63	e62	e60	56	57	145	411	355	173	117
4	114	91	e63	e58	e62	55	53	145	469	341	175	115
5	118	91	e70	e66	e62	55	60	142	634	327	171	113
6	112	91	e66	e72	60	54	57	140	658	315	168	113
7	110	90	e62	e54	e57	55	55	132	759	306	164	113
8	110	90	e62	e50	e54	55	57	131	739	293	160	111
9	109	e84	e60	e52	e52	e52	61	129	727	285	159	116
10	108	89	e58	e54	e56	e50	58	138	743	278	156	118
11	113	90	e58	e50	60	e50	63	152	713	272	151	114
12	110	90	e66	e50	59	e52	71	150	660	264	149	110
13	115	e80	e74	e54	59	e54	78	146	588	254	149	108
14	129	e86	e78	e58	e54	56	70	146	556	247	145	106
15	128	e82	e74	e58	e56	54	75	155	565	241	142	106
16	114	e84	e78	e60	57	54	91	183	619	236	139	105
17	109	e88	e80	e60	58	56	114	203	634	232	137	103
18	107	e90	e78	e64	e57	59	129	230	558	228	134	101
19	107	e86	e74	66	e54	e56	141	265	521	223	137	100
20	108	e86	e74	e60	e52	e54	160	257	511	218	137	100
21	105	84	78	e64	e50	e52	179	255	512	218	131	99
22	103	e78	74	e66	e50	59	238	296	507	214	131	99
23	101	e80	e72	e62	e50	56	186	274	479	206	134	101
24	104	e78	e68	e62	e56	54	165	281	465	203	129	98
25	100	e82	e68	e60	61	57	168	267	459	199	125	97
26	97	e82	e66	e60	e58	57	162	267	461	195	122	96
27	100	e82	e64	e60	e58	54	173	277	447	192	123	95
28	e90	82	e68	e58	56	54	208	324	430	188	136	95
29	95	e80	e66	e54	---	58	182	378	416	185	126	94
30	97	e78	e70	e56	---	60	166	346	403	182	130	94
31	98	---	e70	e64	---	60	---	337	---	179	130	---
Total	3,352	2,576	2,160	1,850	1,592	1,704	3,389	6,594	16,398	7,833	4,520	3,181
Mean	108	85.9	69.7	59.7	56.9	55.0	113	213	547	253	146	106
Max	129	96	80	72	64	60	238	378	759	387	182	123
Min	90	78	58	50	50	50	53	129	360	179	122	94
Ac-ft	6,650	5,110	4,280	3,670	3,160	3,380	6,720	13,080	32,530	15,540	8,970	6,310

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1943 - 2010, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	89.7	77.6	68.5	63.0	60.2	62.1	158	525	610	286	149	107
Max	156	113	88.4	85.0	82.8	99.4	385	1,072	1,377	602	242	166
(WY)	(1987)	(1986)	(1983)	(1983)	(1984)	(1986)	(1946)	(1997)	(1986)	(1975)	(1983)	(1986)
Min	51.0	50.7	41.5	39.7	34.7	39.5	58.6	99.1	96.2	61.4	55.1	52.1
(WY)	(1978)	(1978)	(2002)	(2008)	(2003)	(1988)	(1975)	(1977)	(1977)	(1977)	(1977)	(1977)

Figure 2010.17 (cont.)

10039500 BEAR RIVER AT BORDER, WY

LOCATION.--Lat 42°12'40", long 111°03'11" referenced to North American Datum of 1927, in NE ¼ NE ¼ NE ¼ sec.15, T.14 S., R.46 E., Bear Lake County, ID, Hydrologic Unit 16010102, on left bank 0.2 mi west of Wyoming-Idaho State line, 0.5 mi west of Border, and 2.1 mi upstream from Thomas Fork.

DRAINAGE AREA.--2,480 mi².

PERIOD OF RECORD.--October 1937 to September 1996, October 1996 to September 2000 (seasonal), October 2000 to current year.

REVISED RECORDS.--WDR UT-74-1: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 6,051.63 ft above NGVD of 1929, unadjusted.

REMARKS.--Records fair except for estimated daily discharges, which are poor. Natural flow of stream affected by regulation of upstream reservoirs, diversions for irrigation, and return flow from irrigated areas.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,880 ft³/s, Jun 7, 1983, gage height, 9.69 ft; minimum discharge, 24 ft³/s, Apr 29, 30, 1977.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 3,010 ft³/s, Jun 19, gage height, 8.18 ft.; minimum daily discharge, 85 ft³/s, Sep 20, 21.

DISCHARGE, CUBIC FEET PER SECOND WATER YEAR OCTOBER 2009 TO SEPTEMBER 2010 DAILY MEAN VALUES

[e, estimated]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	138	192	e180	e135	e130	e140	166	384	368	640	163	126
2	142	190	e165	e135	e130	e140	159	381	399	618	160	121
3	143	189	e155	e135	e130	e140	158	385	433	587	150	118
4	141	191	e145	e115	e135	e145	154	349	486	570	151	116
5	149	187	e140	e120	e140	e150	155	279	598	584	149	114
6	159	185	e145	e130	e135	e150	170	302	715	582	147	107
7	159	181	e135	e125	e130	e155	160	312	776	563	148	98
8	157	180	e125	e110	e130	e155	160	303	1,010	560	148	97
9	153	179	e120	e105	e135	e160	166	291	1,250	581	150	97
10	149	176	e120	e115	e140	e160	163	280	1,510	546	152	96
11	161	179	e120	e120	e140	e155	157	286	1,740	479	154	98
12	168	180	e130	e115	e135	e170	164	294	1,880	428	147	96
13	168	177	e140	e120	e140	e180	180	295	1,910	379	139	96
14	174	e170	e160	e125	e140	e185	185	286	2,040	355	137	94
15	186	e165	e170	e130	e135	e190	178	282	2,150	346	140	93
16	181	e160	e155	e125	e130	e195	182	274	2,360	327	139	94
17	160	e160	e150	e120	e130	e200	194	274	2,660	317	139	91
18	138	e160	e150	e115	e135	e210	203	281	2,940	332	136	88
19	150	e165	e140	e120	e135	e220	211	312	2,950	318	137	87
20	161	e165	e140	e120	e130	e200	195	311	2,770	301	140	85
21	159	e165	e150	e125	e125	e200	203	299	2,520	287	134	85
22	156	e170	e160	e125	e125	202	219	349	2,180	289	128	86
23	167	e175	e155	e130	e120	200	234	361	1,890	281	129	88
24	170	e170	e145	e130	e130	199	192	350	1,480	263	129	88
25	171	e160	e135	e130	e135	188	183	343	1,260	253	129	88
26	160	e160	e130	e125	e135	182	213	338	1,090	247	133	86
27	160	e170	e125	e130	e135	178	238	338	876	242	128	88
28	163	e175	e120	e135	e135	177	297	359	790	229	134	91
29	163	e170	e120	e130	---	170	434	389	725	205	123	90
30	172	e170	e120	e125	---	176	402	403	683	171	117	88
31	190	---	e130	e125	---	177	---	369	---	163	125	---
Total	4,968	5,216	4,375	3,845	3,725	5,449	6,075	10,059	44,439	12,043	4,335	2,890
Mean	160	174	141	124	133	176	202	324	1,481	388	140	96.3
Max	190	192	180	135	140	220	434	403	2,950	640	163	126
Min	138	160	120	105	120	140	154	274	368	163	117	85
Ac-ft	9,850	10,350	8,680	7,630	7,390	10,810	12,050	19,950	88,140	23,890	8,600	5,730

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1938-96, 2001-10, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	199	217	189	174	197	362	702	969	1,130	514	217	171
Max	751	693	563	381	479	1,294	1,979	3,158	3,829	1,670	752	671
(WY)	(1983)	(1983)	(1983)	(1985)	(1986)	(1986)	(1985)	(1952)	(1983)	(1983)	(1983)	(1983)
Min	43.5	74.6	97.2	77.6	75.2	105	71.2	74.4	62.2	54.2	42.3	38.5
(WY)	(2002)	(2002)	(2002)	(1993)	(1993)	(1988)	(1977)	(1977)	(1977)	(1977)	(1940)	(1940)

Figure 2010.17 (cont.)

RAINBOW INLET CANAL NEAR DINGLE, ID (10046000)

STREAMFLOW RECORDS FOR WATER YEAR 2010

LOCATION.--Lat 42°13'48", long 111°17'43" referenced to North American Datum of 1927, in NW ¼ SW ¼ SE ¼ sec.3, T.14 S., R.44 E., BEAR LAKE County, Hydrologic Unit 16010201, on right bank 1.5 mi west of Dingle and 1.8 mi downstream from headworks at Stewart Dam.

PERIOD OF RECORD.--October 2006 to current year published by PacifiCorp. January 1922 to September 2006 published in United States Geological Survey Water-Data Reports. Monthly discharge only prior to October 1945, published in United States Geological Survey WSP 1314.

GAGE.--Water-stage recorder. Elevation of gage datum is 5,922.0 ft above NGVD of 1929, (by topographic survey). Prior to October 1, 1923, at site 300 ft downstream at different datum; October 1, 1923 to October 27, 1944, at site 0.5 mi downstream at different datum.

REMARKS.--Records fair except for estimated daily discharges, which are poor. Canal diverts from Bear River at Stewart Dam in NE¼ sec. 34, T.013 S., R.0 44 E., for storage in Bear Lake. At times flow in canal is augmented by surplus water from Black Otter Slough entering at the station and by seepage and surplus water from irrigation. Flow contributions from Black Otter Slough is included in the values below.

AVERAGE DISCHARGE FOR PERIOD OF RECORD.--88 years, 344 ft³/s, 256,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 4,950 ft³/s, May 27, 1984; no flow Apr 28, 1977 and Oct 1, 1979.

DISCHARGE MEASUREMENT DATES.-- 9-12-09, 10-15-09, 11-1-09, 1-6-10, 2-8-10, 3-7-10, 5-16-10, 6-14-10, 6-20-10, 6-27-10, 7-10-10, 7-23-10, 8-7-10, 8-21-10, 9-25-10, 10-16-10.

Rainbow Inlet Canal near Dingle, ID (10046000) Water Year 2010 (October 2009 to September 2010)

Daily Mean Values

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	
1	77.5	262	191	133	144	161	150	280	140	781	133	81	
2	92.6	255	198	140	170	183	150	280	140	726	106	81	
3	114	241	209	143	165	171	150	280	150	666	90.2	85	
4	154	234	188	143	152	159	150	280	160	635	77.5	95	
5	174	262	178	141	155	159	150	230	215	607	69.8	95	
6	180	287	165	134	143	165	150	200	313	605	65.7	95	
7	182	294	154	125	129	162	150	190	394	612	67	95	
8	181	294	157	128	157	162	150	190	471	609	68.4	85	
9	174	294	155	141	154	162	150	80	644	601	69.7	85	
10	182	296	153	129	136	162	150	110	863	614	71.1	85	
11	175	287	168	118	121	162	150	80	1060	616	72.4	85	
12	185	275	191	119	108	162	150	85.3	1290	571	73.8	75	
13	192	270	181	124	100	162	150	95.2	1450	536	75.1	70	
14	199	260	168	128	131	162	150	102	1530	487	76.4	70	
15	240	249	176	129	128	162	160	92	1550	397	77.8	60	
16	255	241	191	136	112	162	160	82.4	1600	373	79.1	55	
17	262	230	191	141	105	170	160	83.2	1720	355	80.5	55	
18	255	233	193	144	101	170	160	77	1880	315	81.8	55	
19	241	251	200	141	127	180	160	79.8	2120	310	83.2	40	
20	233	264	198	142	168	190	170	60	2280	278	84.5	30	
21	238	241	193	145	160	170	170	135	2340	274	81	30	
22	240	216	188	143	157	170	170	50	2330	261	81	30	
23	245	211	190	136	162	170	170	60	2230	257	81	25	
24	249	204	189	137	155	170	170	70	1810	253	81	24	
25	253	199	185	156	147	160	170	70	1310	236	81	19	
26	258	198	168	148	175	160	170	85	1080	212	81	19	
27	256	199	155	135	178	160	170	90	950	202	81	19	
28	245	193	145	141	168	160	150	90	835	197	81	19	
29	245	198	135	149	168	150	150	90	757	193	81	19	
30	244	194	128	145	168	150	260	90	775	186	81	19	
31	249		127	149	168	150		90		161	81		
Monthly Statistics													
Total	6,470	7,332	5,408	4,263	4,008	5,098	4,820	3,877	34,387	13,126	2,494	1,700	Yearly Stats
Mean	209	244	174	138	143	164	161	125	1,150	423	81	57	92,983
Min	78	193	127	118	100	150	150	50	140	161	66	19	19
Max	262	296	209	156	178	190	260	280	2,340	781	133	95	2,340
Ins. Min	67	187	124	115	96	77	39	50	140	147	57	12	12
Ins. Max	266	362	215	172	190	249	260	285	2,370	798	312	364	2,370
Ac-ft	12,830	14,540	10,730	8,460	7,950	10,110	9,560	7,690	68,210	26,040	4,950	3,370	184,440

Figure 2010.17 (cont.)

**PacifiCorp Energy
Reservoir Records
Bear Lake 2009-2010
Daily Contents (Acre Feet)**

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Day
1	534156	526415	521902	526415	540613	553776	569089	595727	617900	696141	620514	538675	1
2	532865	525770	521902	527060	541260	553776	569738	596379	617900	695479	619207	536738	2
3	531575	524480	521902	527705	541260	554377	570386	596379	617900	694156	617900	535447	3
4	530930	524480	521902	528350	541906	554377	571035	597030	618554	693494	615941	534156	4
5	530930	524480	521902	528995	541906	554978	572332	597030	619860	692171	612676	532865	5
6	530285	524480	521902	529640	542552	555578	573630	597681	621821	690848	610065	531575	6
7	529640	524480	521902	529640	542552	556179	574928	598984	623783	689526	608109	529640	7
8	529640	523191	521902	529640	543198	556780	576876	600286	625092	687543	604848	527705	8
9	529640	521902	521902	530285	543844	557427	578823	600937	626400	685560	601589	525770	9
10	529640	521258	521902	530285	544490	558074	580771	601589	628362	683578	598332	523835	10
11	529640	520613	522546	530285	545136	558074	582070	602240	630326	681597	595076	522546	11
12	528995	520613	522546	530285	545783	558722	582720	603544	632945	678956	591822	521902	12
13	528350	520613	522546	530930	547507	558722	583370	604196	636221	676317	589221	521258	13
14	527705	520613	523191	530930	548970	559369	584019	605500	639497	673679	585970	520613	14
15	527060	521258	523191	531575	549571	560017	584669	606805	644744	669724	582720	519969	15
16	527060	521258	523191	532220	550171	560664	585319	607457	649994	665773	580122	518810	16
17	526415	521902	523191	532865	550772	561312	585970	608109	654593	663140	577525	517651	17
18	526415	521902	523191	532865	551373	561960	586620	608761	659851	660508	574279	516491	18
19	526415	521902	523191	533510	551373	561960	586620	609413	665115	657878	571683	515332	19
20	526415	521902	523191	533510	551373	562608	587920	610065	669066	655250	568441	514753	20
21	526415	521902	523835	534156	551974	562608	588570	611370	673020	652621	565200	514173	21
22	526415	521902	523835	534156	551974	563255	589221	612676	676976	649337	562608	513529	22
23	526415	521902	523835	534801	551974	563255	590521	613981	680937	646056	559369	512671	23
24	526415	521902	523835	534801	552574	563903	591822	615287	684899	642775	556179	511813	24
25	526415	521902	524480	535447	552574	564551	592473	615941	688865	639497	553175	511813	25
26	526415	521902	524480	535447	553175	565200	593123	616594	692171	635566	550772	511813	26
27	526415	521902	524480	536092	553776	565848	593774	617247	694156	632290	548369	510955	27
28	526415	521902	524480	536092	553776	566496	594425	617247	697466	629017	545136	510955	28
29	526415	521902	524480	537384		567144	595076	617247	698128	625746	543198	510312	29
30	526415	521902	525125	538029		567793	595727	617900	696803	623129	541260	509669	30
31	526415		525770	539321		568441		617900		621821	539967		31

Monthly Totals													
Mean	528,204	522,418	523,149	532,346	547,765	560,556	583,721	607,145	652,778	664,167	580,364	520,781	568,616
Min	526,415	520,613	521,902	526,415	540,613	553,776	569,089	595,727	617,900	621,821	539,967	509,669	509,669
Max	534,156	526,415	525,770	539,321	553,776	568,441	595,727	617,900	698,128	696,141	620,514	538,675	698,128

Notes:

Figure 2010.17 (cont.)

**PacifiCorp Energy
Reservoir Level Records
Bear Lake 2009-2010
Daily Stage (Ft) Add 5900 for Elevation**

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Day
1	10.65	10.53	10.46	10.53	10.75	10.95	11.19	11.60	11.94	13.13	11.98	10.72	1
2	10.63	10.52	10.46	10.54	10.76	10.95	11.20	11.61	11.94	13.12	11.96	10.69	2
3	10.61	10.50	10.46	10.55	10.76	10.96	11.21	11.61	11.94	13.10	11.94	10.67	3
4	10.60	10.50	10.46	10.56	10.77	10.96	11.22	11.62	11.95	13.09	11.91	10.65	4
5	10.60	10.50	10.46	10.57	10.77	10.97	11.24	11.62	11.97	13.07	11.86	10.63	5
6	10.59	10.50	10.46	10.58	10.78	10.98	11.26	11.63	12.00	13.05	11.82	10.61	6
7	10.58	10.50	10.46	10.58	10.78	10.99	11.28	11.65	12.03	13.03	11.79	10.58	7
8	10.58	10.48	10.46	10.58	10.79	11.00	11.31	11.67	12.05	13.00	11.74	10.55	8
9	10.58	10.46	10.46	10.59	10.80	11.01	11.34	11.68	12.07	12.97	11.69	10.52	9
10	10.58	10.45	10.46	10.59	10.81	11.02	11.37	11.69	12.10	12.94	11.64	10.49	10
11	10.58	10.44	10.47	10.59	10.82	11.02	11.39	11.70	12.13	12.91	11.59	10.47	11
12	10.57	10.44	10.47	10.59	10.83	11.03	11.40	11.72	12.17	12.87	11.54	10.46	12
13	10.56	10.44	10.47	10.60	10.85	11.03	11.41	11.73	12.22	12.83	11.50	10.45	13
14	10.55	10.44	10.48	10.60	10.87	11.04	11.42	11.75	12.27	12.79	11.45	10.44	14
15	10.54	10.45	10.48	10.61	10.88	11.05	11.43	11.77	12.35	12.73	11.40	10.43	15
16	10.54	10.45	10.48	10.62	10.89	11.06	11.44	11.78	12.43	12.67	11.36	10.41	16
17	10.53	10.46	10.48	10.63	10.90	11.07	11.45	11.79	12.50	12.63	11.32	10.39	17
18	10.53	10.46	10.48	10.63	10.91	11.08	11.46	11.80	12.58	12.59	11.27	10.37	18
19	10.53	10.46	10.48	10.64	10.91	11.08	11.46	11.81	12.66	12.55	11.23	10.35	19
20	10.53	10.46	10.48	10.64	10.91	11.09	11.48	11.82	12.72	12.51	11.18	10.34	20
21	10.53	10.46	10.49	10.65	10.92	11.09	11.49	11.84	12.78	12.47	11.13	10.33	21
22	10.53	10.46	10.49	10.65	10.92	11.10	11.50	11.86	12.84	12.42	11.09	10.32	22
23	10.53	10.46	10.49	10.66	10.92	11.10	11.52	11.88	12.90	12.37	11.04	10.31	23
24	10.53	10.46	10.49	10.66	10.93	11.11	11.54	11.90	12.96	12.32	10.99	10.30	24
25	10.53	10.46	10.50	10.67	10.93	11.12	11.55	11.91	13.02	12.27	10.94	10.30	25
26	10.53	10.46	10.50	10.67	10.94	11.13	11.56	11.92	13.07	12.21	10.90	10.30	26
27	10.53	10.46	10.50	10.68	10.95	11.14	11.57	11.93	13.10	12.16	10.86	10.29	27
28	10.53	10.46	10.50	10.68	10.95	11.15	11.58	11.93	13.15	12.11	10.82	10.29	28
29	10.53	10.46	10.50	10.70	10.95	11.16	11.59	11.93	13.16	12.06	10.79	10.28	29
30	10.53	10.46	10.51	10.71	10.95	11.17	11.60	11.94	13.14	12.02	10.76	10.27	30
31	10.53	10.46	10.52	10.73	10.95	11.18	11.94	11.94	12.00	12.00	10.74	10.27	31

BEAR LAKE STATISTICS

Monthly													
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Yearly
Daily Mean	10.56	10.47	10.48	10.62	10.86	11.06	11.42	11.78	12.47	12.64	11.36	10.44	11.18
Daily Min	10.53	10.44	10.46	10.53	10.75	10.95	11.19	11.60	11.94	12.00	10.74	10.27	10.27
Daily Max	10.65	10.53	10.52	10.73	10.95	11.18	11.60	11.94	13.16	13.13	11.98	10.72	13.16

Notes: Based on lake elevations taken at Utah State Park Marina.

Figure 2010.17 (cont.)

**BEAR LAKE OUTLET CANAL
NEAR PARIS, ID
(10059500)**

STREAMFLOW RECORDS FOR WATER YEAR 2010

LOCATION.--Lat 42°13'00", long 111°20'35" referenced to North American Datum of 1927, in SW ¼ NW ¼ SW ¼ sec.8, T.14 S., R.44 E., Bear Lake County, ID, Hydrologic Unit 16010201, on right bank 2,000 ft downstream from headgates (at dike) and 3 mi southeast of Paris.

PERIOD OF RECORD.--October 2006 to current year published by PacifiCorp. September 1945 to September 2006 published in USGS Water Data Reports. Monthly discharge only January 1922 to September 1945, published in WSP 1314.

GAGE.--Water-stage recorder. Datum of gage is 5,912.6 ft above NGVD of 1929, unadjusted.

REMARKS.--The Outlet canal was opened up on November 13th to refill irrigation releases made from Soda reservoir. The Outlet canal was closed again on November 19th, 2009. A minimum leakage flow of 5 cfs is assumed when the gates are shut.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 3,080 ft³/s, Jun 19-21, 1986; minimum daily discharge, 1.0 ft³/s, for many days in 1937, 1954, 1959, 1961, 1964, 1977-78.

**Bear Lake Outlet Canal near Paris, ID (10059500)
Water Year 2010 (October 2009 to September 2010)**

Daily Mean Values

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	
1	75	559	5	5	5	5	5	5	5	905	1110	472	
2	75	801	5	5	5	5	5	5	5	867	1120	390	
3	75	893	5	5	5	5	5	5	5	863	1130	390	
4	75	463	5	5	5	5	5	5	5	847	1060	388	
5	75	206	5	5	5	5	5	5	5	901	994	389	
6	75	134	5	5	5	5	5	5	5	1080	1000	384	
7	5	5	5	5	5	5	5	5	5	1190	1010	381	
8	5	5	5	5	5	5	5	5	5	1180	1020	374	
9	5	5	5	5	5	5	5	5	5	1340	1110	379	
10	5	5	5	5	5	5	5	5	5	1520	1170	378	
11	5	5	5	5	5	5	5	5	5	1520	1120	292	
12	5	5	5	5	5	5	5	5	5	1510	1140	263	
13	5	108	5	5	5	5	5	5	5	1500	1120	259	
14	5	235	5	5	5	5	5	5	5	1500	1090	253	
15	5	231	5	5	5	5	5	5	5	1510	1160	195	
16	5	237	5	5	5	5	5	5	5	1510	1210	100	
17	5	233	5	5	5	5	5	5	5	1510	1190	95.4	
18	5	233	5	5	5	5	5	5	5	1500	1180	92.7	
19	5	154	5	5	5	5	5	5	5	1490	1170	90.1	
20	5	5	5	5	5	5	5	5	5	1510	1160	91.1	
21	5	5	5	5	5	5	5	5	5	1530	1140	87.8	
22	5	5	5	5	5	5	5	5	5	1540	1150	84.8	
23	5	5	5	5	5	5	5	5	5	1450	1150	137	
24	5	5	5	5	5	5	5	5	181	1330	1110	181	
25	5	5	5	5	5	5	5	5	393	1340	1040	180	
26	5	5	5	5	5	5	5	5	562	1240	989	178	
27	5	5	5	5	5	5	5	5	933	1110	860	175	
28	5	5	5	5	5	5	5	5	1180	1110	786	220	
29	5	5	5	5	5	5	5	5	1140	1130	778	288	
30	93.1	5	5	5	5	5	5	5	984	1120	772	288	
31	358		5	5		5		5		1120	660		
Monthly Statistics													Yearly Stats
Total	1,016	4,572	155	155	140	155	150	155	5,488	39,773	32,699	7,476	91,934
Mean	33	152	5	5	5	5	5	5	183	1,280	1,050	249	249
Min	5	5	5	5	5	5	5	5	5	847	660	85	5
Max	358	893	5	5	5	5	5	5	1,180	1,540	1,210	472	1,540
Ins. Min	5	5	5	5	5	5	5	5	5	833	540	74	5
Ins. Max	540	1,080	5	27	39	47	5	5	1,190	1,540	1,240	536	1,540
Ac-ft	2,020	9,070	307	307	278	307	298	307	10,890	78,890	64,860	14,830	182,364

Figure 2010.17 (cont.)

10092700 BEAR RIVER AT IDAHO-UTAH STATE LINE

LOCATION.--Lat 42°00'47", long 111°55'14" referenced to North American Datum of 1927, in NE ¼ NW ¼ NE ¼ sec.29, T.16 S., R.39 E., Franklin County, ID, Hydrologic Unit 16010202, on left bank 1,050 ft downstream from inlet canal to Cub River pumps, 1.1 mi downstream from Weston Creek, 1.8 mi upstream from Idaho-Utah State line, and 3.5 mi southeast of Weston.

PERIOD OF RECORD.--October 1970 to current year.

REVISED RECORDS.--WDR UT-74-1: Drainage area.

GAGE.--Water-stage recorder and crest-stage gage. Elevation of gage is 4,420 ft above NGVD of 1929, from topographic map. Prior to September 10, 1982 at datum 2.00 ft higher. September 10, 1982 to September 30, 1985 at datum 10.0 ft lower.

REMARKS.--Records fair except for estimated daily discharges, which are poor. Natural flow of stream affected by storage reservoirs, power developments, diversions for irrigation, and return flow from irrigated areas.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,870 ft³/s, Jun 14, 1984, gage height, 19.20 ft, present datum; maximum gage height, 19.72 ft, Jun 21, 1983, present datum; minimum daily discharge, 24 ft³/s, May 16, 2004.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,180 ft³/s, Apr 20, gage height, 11.47 ft; minimum daily discharge, 180 ft³/s, Jun 24, 25, 26.

DISCHARGE, CUBIC FEET PER SECOND WATER YEAR OCTOBER 2009 TO SEPTEMBER 2010 DAILY MEAN VALUES

[e, estimated]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	e323	388	378	e500	481	442	543	481	577	515	599	625
2	319	396	e380	e520	474	441	536	477	638	498	587	599
3	351	351	e380	e490	443	430	565	447	643	438	587	471
4	361	374	e370	e440	438	441	656	369	667	472	607	480
5	429	372	e380	451	440	445	610	341	778	500	625	447
6	398	375	e390	450	442	438	632	347	969	524	697	439
7	361	391	e400	e410	440	451	645	446	822	639	706	447
8	369	418	e390	e370	449	453	629	448	982	664	715	435
9	424	420	e380	e380	429	473	623	419	976	899	735	427
10	396	410	e360	e400	416	520	619	397	954	978	780	488
11	381	425	e400	e390	412	500	619	374	865	966	765	507
12	380	421	e430	e390	454	499	623	442	845	1,000	751	395
13	365	357	488	e420	448	476	649	503	830	971	731	338
14	346	343	498	e430	443	473	669	523	853	1,020	730	330
15	341	341	473	441	441	474	658	500	881	1,000	788	334
16	403	339	481	450	440	479	701	473	943	1,010	817	361
17	467	346	460	e430	443	500	697	468	978	860	788	366
18	481	e350	490	e400	447	511	745	441	970	829	727	359
19	421	e354	517	e450	445	522	777	479	877	853	716	372
20	422	e356	509	e450	436	516	813	510	782	842	708	339
21	397	356	507	e450	435	503	728	462	609	806	775	309
22	391	354	507	e460	406	503	832	474	455	847	763	328
23	387	360	508	e450	416	512	896	476	376	746	783	335
24	401	388	e500	e440	425	503	758	588	e180	742	968	333
25	426	359	e490	e430	457	489	660	605	e180	741	979	329
26	384	392	e470	e470	457	517	665	510	180	738	977	326
27	418	396	e460	445	448	545	564	513	356	776	846	320
28	404	397	e440	441	449	545	511	548	437	756	760	317
29	377	396	e430	438	---	540	506	580	499	681	729	321
30	383	392	e450	405	---	544	466	604	521	716	626	404
31	436	---	e480	393	---	547	---	550	---	599	572	---
Total	12,142	11,317	13,796	13,484	12,354	15,232	19,595	14,795	20,623	23,626	22,937	11,881
Mean	392	377	445	435	441	491	653	477	687	762	740	396
Max	481	425	517	520	481	547	896	605	982	1,020	979	625
Min	319	339	360	370	406	430	466	341	180	438	572	309
Ac-ft	24,080	22,450	27,360	26,750	24,500	30,210	38,870	29,350	40,910	46,860	45,500	23,570

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1971 - 2010, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	835	888	902	887	896	1,096	1,315	1,382	1,267	964	882	829
Max	2,850	2,983	2,552	1,904	2,556	3,264	3,594	3,968	4,263	3,442	2,416	2,545
(WY)	(1984)	(1984)	(1985)	(1984)	(1986)	(1986)	(1986)	(1986)	(1986)	(1983)	(1984)	(1986)
Min	223	298	310	269	296	351	351	158	301	368	461	192
(WY)	(2004)	(1993)	(1982)	(2004)	(2002)	(1991)	(2003)	(2003)	(2004)	(2006)	(1993)	(1992)

Figure 2010.17 (cont.)

**10109001 COMBINED DISCHARGE, IN CUBIC FEET PER SECOND, OF LOGAN RIVER ABOVE
STATE DAM AND LOGAN, HYDE PARK AND SMITHFIELD CANAL NEAR LOGAN, UT**

REVISED RECORDS.--WDR UT-04-1: Discharge

**DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2009 TO SEPTEMBER 2010
DAILY MEAN VALUES**

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	159	140	116	108	98	91	103	229	443	447	213	161
2	159	139	116	107	95	91	101	219	481	428	208	160
3	160	137	112	106	96	92	105	204	536	408	203	158
4	166	136	109	102	97	93	100	200	652	389	201	159
5	164	136	108	105	96	94	105	196	811	368	199	159
6	157	135	108	105	98	93	107	195	834	354	198	157
7	157	135	107	99	96	94	102	187	898	340	198	157
8	157	134	108	98	94	94	103	186	866	328	196	158
9	155	132	109	105	93	95	108	186	834	320	192	160
10	152	132	110	105	93	94	110	195	825	314	190	158
11	156	131	110	102	95	93	112	221	809	306	190	153
12	153	133	111	101	95	93	116	228	753	296	188	149
13	153	131	115	101	95	93	124	215	706	288	185	148
14	161	132	112	102	93	93	119	210	636	285	183	148
15	156	127	110	101	94	95	124	215	637	272	182	147
16	152	125	112	101	93	96	140	231	661	265	180	146
17	151	126	112	100	93	97	164	267	672	261	178	145
18	150	128	111	101	93	99	197	318	617	256	176	143
19	149	125	110	103	93	99	216	366	572	250	179	143
20	148	124	111	100	93	97	241	403	577	244	176	143
21	146	125	110	101	92	97	262	395	578	243	174	143
22	144	124	110	101	88	97	265	406	568	239	175	144
23	145	123	110	102	88	97	239	360	551	234	174	143
24	150	120	106	101	91	98	226	358	535	231	169	141
25	146	121	104	97	92	98	226	327	527	229	167	140
26	142	121	100	99	90	99	225	317	521	224	166	140
27	146	123	104	99	91	97	233	316	512	223	165	139
28	144	121	105	97	91	97	268	350	488	218	167	138
29	141	119	106	96	---	97	263	419	471	216	165	139
30	141	118	108	94	---	100	240	383	458	213	170	138
31	140	---	109	100	---	105	---	394	---	211	165	---
Total	4,700	3,853	3,389	3,139	2,616	2,968	5,044	8,696	19,029	8,900	5,672	4,457
Mean	152	128	109	101	93.4	95.7	168	281	634	287	183	149
Max	166	140	116	108	98	105	268	419	898	447	213	161
Min	140	118	100	94	88	91	100	186	443	211	165	138
Ac-ft	9,320	7,640	6,720	6,230	5,190	5,890	10,000	17,250	37,740	17,650	11,250	8,840

Figure 2010.17 (cont.)

10126000 BEAR RIVER NEAR CORINNE, UT

LOCATION.--Lat 41°34'35", long 112°06'00" referenced to North American Datum of 1927, in NE ¼ SE ¼ NE ¼ sec.30, T.10 N., R.2 W., Box Elder County, UT, Hydrologic Unit 16010204, on right bank 1.2 mi downstream from Salt Creek, 2.0 mi northeast of Corinne, and 2.8 mi downstream from Malad River.

DRAINAGE AREA.--7,029 mi².

PERIOD OF RECORD.--October 1949 to September 1957, October 1963 to current year.

REVISED RECORDS.--WRD UT-74-1: Drainage area.

GAGE.--Water-stage recorder and crest-stage gage. Datum of gage is 4,204.6 ft above NGVD of 1929, unadjusted. Auxiliary nonrecording gage 7,800 ft downstream July 27, 1950 to November 21, 1955.

REMARKS.--Records good except for estimated daily discharges, which are poor. Natural flow of stream affected by Cutler Dam many miles upstream of gage, power development, diversions for irrigation, and return flow from irrigated areas and backwater from Bear River Bird Refuge about 5 miles downstream.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 14,770 ft³/s, May 19, 1984, gage height, 17.50 ft; minimum daily discharge, 23 ft³/s, Jul 30, 2004.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 2,810 ft³/s, Jun 10,11, gage height, 9.19 ft; minimum daily discharge, 92 ft³/s, Jul 8.

DISCHARGE, CUBIC FEET PER SECOND WATER YEAR OCTOBER 2009 TO SEPTEMBER 2010 DAILY MEAN VALUES

[e, estimated]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	667	1,030	1,950	e730	e965	876	1,260	1,040	1,290	144	104	217
2	755	1,420	1,850	e1,000	e960	837	1,030	1,090	1,290	134	114	244
3	845	1,320	1,530	e1,100	e965	819	1,410	1,100	1,260	119	117	184
4	706	1,280	e890	e1,100	e965	830	1,580	1,060	1,510	114	117	217
5	488	1,240	443	e1,100	e965	878	1,330	527	2,110	116	120	223
6	804	1,200	234	e1,090	e965	903	1,080	266	2,150	110	120	198
7	1,270	1,090	233	e1,050	e975	1,070	1,040	830	1,940	98	124	187
8	1,210	1,010	e572	e1,050	e975	1,370	2,150	1,050	2,050	92	122	195
9	1,260	992	e727	e1,020	e970	1,400	1,250	1,050	2,640	93	123	196
10	1,180	997	e744	e970	e970	1,430	1,100	808	2,770	101	126	196
11	853	1,090	e844	e600	e975	1,460	1,450	440	2,720	96	128	200
12	566	1,120	e934	e610	e980	1,470	1,520	362	2,650	108	115	203
13	935	1,120	e1,020	e750	e980	1,470	1,380	307	2,560	111	117	210
14	1,200	1,110	e1,150	e870	e985	1,250	1,380	594	2,390	105	117	206
15	1,150	1,120	e1,170	e970	e980	1,000	1,500	1,090	2,190	104	114	208
16	1,230	1,120	e1,120	e980	e980	1,040	1,540	1,240	2,080	105	120	204
17	1,100	1,050	e1,090	e980	e985	1,260	1,630	852	1,850	134	117	201
18	788	953	e1,090	e1,070	e990	1,470	1,660	819	1,830	178	118	203
19	556	884	e1,090	e1,080	e1,000	1,480	1,730	1,110	1,890	215	126	215
20	1,800	868	e1,090	e1,080	e1,000	1,420	1,830	962	1,940	183	116	236
21	1,280	872	e1,090	e1,080	e1,000	1,350	1,820	837	1,940	163	118	243
22	852	854	e1,090	e1,080	e1,000	1,220	1,910	909	1,610	140	109	237
23	668	827	e1,080	e1,070	e1,010	913	2,120	1,250	1,140	123	107	225
24	749	840	e1,080	e1,060	e1,000	718	1,910	1,430	854	116	111	217
25	788	850	e1,080	e980	e1,010	1,000	2,200	1,410	684	113	123	206
26	447	853	e1,070	e960	1,010	1,370	2,010	1,380	552	115	118	214
27	1,180	859	e985	e950	945	1,290	1,700	1,400	259	111	109	222
28	1,240	857	e840	e950	890	1,190	1,500	1,370	157	107	119	217
29	982	853	e650	e950	---	1,080	1,280	1,290	145	113	116	212
30	1,040	1,380	e650	e950	---	1,030	1,050	1,280	141	106	114	208
31	1,060	---	e670	e960	---	1,280	---	1,280	---	107	129	---
Total	29,649	31,059	30,056	30,190	27,395	36,174	46,350	30,433	48,592	3,774	3,648	6,344
Mean	956	1,035	970	974	978	1,167	1,545	982	1,620	122	118	211
Max	1,800	1,420	1,950	1,100	1,010	1,480	2,200	1,430	2,770	215	129	244
Min	447	827	233	600	890	718	1,030	266	141	92	104	184
Ac-ft	58,810	61,610	59,620	59,880	54,340	71,750	91,940	60,360	96,380	7,490	7,240	12,580

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1950-57, 1964-2010, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	1,279	1,537	1,609	1,732	1,769	2,257	2,768	2,811	2,122	652	565	843
Max	4,240	4,471	4,414	3,639	5,966	6,041	7,258	9,598	9,201	4,186	3,045	3,423
(WY)	(1984)	(1985)	(1984)	(1984)	(1986)	(1986)	(1985)	(1984)	(1984)	(1983)	(1983)	(1984)
Min	95.6	621	535	620	723	913	638	71.8	77.6	40.4	46.7	62.2
(WY)	(1993)	(2001)	(1995)	(1993)	(1993)	(1991)	(1992)	(1992)	(1992)	(2003)	(2004)	(1992)

Figure 2010.17 (cont.)